Linking Future Training Concepts to Army Individual Training Programs

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United States Army

RAND

PREFACE

This report documents results of a research project entitled "Future Individual Training Strategies." The overall project objective is to analyze, across a range of occupations, alternative training approaches that may be more affordable and flexible than current techniques for conducting Army individual skill training, with special attention to resident training conducted in U.S. Army schools.

This report presents results of the first task of the research, which examines training-related characteristics of Army military occupational specialties (MOS). The analysis identifies general dimensions of Army MOS that may be linked to approaches for conducting individual training. The dimensions provide a basis for grouping, ranking, and selecting specific MOS for further analysis of the costs and feasibility of changing training approaches. The results should be of interest to policymakers responsible for Army training and to training managers concerned with the design and implementation of training programs for specific Army MOS. The research was conducted in the Manpower and Training program of the Arroyo Center and is sponsored by the Office of the Deputy Chief of Staff for Training, U.S. Army Training and Doctrine Command.

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Lynn E. Davis is Vice President for the Army Research Division and Director of the Arroyo Center. Those interested in further information about the Arroyo Center should contact her office directly:

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SUMMARY

BACKGROUND

The U.S. Army will face significant challenges affecting its ability to train its soldiers in the coming years. Resources for supporting Army training are expected to decrease as the defense budget declines. In addition, traditional methods of training will face increasing restraints involving use of equipment, munitions, and maneuver ranges. Individual military education and training in U.S. Army schools will experience especially intense budget pressure. Currently, the Army operates an extensive infrastructure of training institutions that utilize considerable manpower, equipment, consumables, and facilities. In fiscal year 1990, for example, these institutions processed roughly 117,000 manyears of students and trainees at an estimated cost of $7.4 billion. These activities will face particular scrutiny as pressure to reduce costs continues to grow.

To cope with these challenges, the Army is attempting to devise new training concepts and strategies that could achieve effectiveness similar to that of current methods at reduced cost. For example, the U.S. Army Training and Doctrine Command (TRADOC) has developed several new concepts for conducting individual training in the future that could lead to profound changes. Some of these concepts would reduce substantially the size and scope of training conducted in residence at Army schools. Others would expand the use of training technologies or transfer training functions from schools to settings such as home stations or civilian training facilities. Thus far, however, only limited analysis has examined the implications of such changes across the range of individual training programs conducted by the Army. Additional analysis is needed to identify specific Army occupations that would be affected, how training would be changed, the cost savings that may be achieved, and other consequences of such changes.

RESEARCH OBJECTIVES, APPROACH, AND LIMITATIONS

This report presents results of research intended to assist the Army in such analyses. The overall objective of this research is to assess alternative approaches for conducting individual training that may be more affordable than current methods, with special attention to training conducted in residence at Army schools. Here we report the results of the first phase of our research, which seeks to link Army military occupational specialties (MOS) to potential concepts for changing Army individual training in the future.

Our analyses proceed in steps. First, we consider the various programs of individual military education and training in which substantial resources might be saved by implementing new training concepts. Because of its scope and resource intensity, we focus further analysis on entry-level training of enlisted personnel, which prepares soldiers for their initial duty assignment. We use Army doctrinal publications, published literature, and Department of Defense and civilian data sources to compile a dataset containing information related broadly to training for entry-level enlisted MOS, which includes measures characterizing trainees and jobholders, the nature of the training provided, and the work performed in the oc-

cupation.[1] We then perform factor analysis, an exploratory statistical procedure designed to identify a smaller number of general dimensions that underlie a larger number of measures.

We next interpret the results to link general dimensions and specific MOS to a number of future individual training concepts. First we relate the general dimensions to several concepts for changing individual training in the future. Next we develop guidelines that suggest MOS where new training concepts may prove most feasible and cost-effective. The guidelines set priorities based on rankings of the MOS by the various dimensions (e.g., nature of training, work performed, etc.).

Limitations of the analysis must be kept in mind. The general dimensions reflect relationships among the data included in the analysis. They might change as additional data are made available. The theoretical and empirical foundations for relating training concepts to general dimensions and specific MOS need strengthening. Existing research does not provide sufficient insight into how characteristics of occupations should influence the design and organization of training programs. In addition, some training concepts considered by the Army are more well defined than others in specifying where and how they may be implemented. Hence this research should be viewed as exploratory and suggestive in linking various training concepts to MOS. Further research is needed to confirm training-related occupational taxonomies and devise appropriate training strategies.

RESULTS

Our results indicate that the training-related characteristics of entry-level enlisted MOS in our analysis can be summarized by a small number of general dimensions, the most important of which are *ability requirements, civilian exchangeability, dominant tasks,* and *cost to train.* Ability requirements indicate the degree to which the MOS requires general intelligence, specific vocational aptitude, and preservice educational preparation. Civilian exchangeability indicates the similarity between Army MOS and civilian jobs and training programs, including whether the MOS is combat-related. Dominant tasks indicate whether the duties of the MOS emphasize cognitive or informational tasks, as opposed to procedural or manipulative tasks. Finally, the cost dimension points to those MOS with significantly different training costs.

In the body of the report, we suggest how these dimensions may relate to concepts for changing training in the future, including "distributed training," expanded use of training devices, and increased reliance on civilian education and training. Moreover, we suggest criteria that may be used to identify specific MOS as potentially appropriate for the selected training concepts.

To illustrate, we consider MOS that may be especially suitable for distributed training. Distributed training envisions the use of "distance learning" technologies[2] to support training outside the schoolhouse (e.g., at homestations, regional training centers, and other selected sites). A major goal is to reduce the time soldiers spend in school and away from units. Proponents believe it may be especially suitable for training and reinforcing complex cogni-

[1]This dataset is described in a companion document (Kirin and Winkler, forthcoming).

[2]Distance learning technologies include print media, videotapes, computer-based training, interactive videodisc, and televideo.

tive skills, which are particularly subject to skill decay. Thus, the ranking of an MOS on "dominant tasks" should suggest its suitability for distributed training, with those MOS with the greatest preponderance of cognitive tasks being most suitable. According to our analysis, these would include a number of administrative, medical, aviation, and supply and services MOS.

The feasibility of distributed training will also depend on its potential to save costs and resources. Using the rankings of MOS from our analysis, we identify the specific MOS with the highest cost to train and the highest proportion of cognitive tasks. These should hold the greatest promise for achieving significant resource savings through distributed training.

Results drawn from our analyses are illustrated in Table S.1. The table also lists the MOS that our analyses suggest may provide the greatest potential for saving costs through expanded use of training devices and civilian substitution (vocational education, contract training, or lateral entry), considering total cost to train and the dominance of procedural skills or similarity with civilian occupations and training programs, respectively.

These criteria are suggestive; refinements and modifications can be made as training concepts are refined further and strategies for implementation are developed. Section 4 of this report suggests initial criteria that may be applied for selecting MOS suitable for training concepts now under consideration by the Army, and it contains listings of candidate MOS for each of the training concepts. Complete rankings of the 242 entry-level enlisted MOS considered in our analysis on each of the training dimensions are contained in the appendices to this report.

CONCLUSIONS

We conclude that analyzing Army MOS with respect to training-related characteristics can reveal insights into general dimensions relevant to concepts and strategies for training. In addition, using these dimensions to classify and rank Army MOS can help identify the

Table S.1

Costly MOS and Potential Training Concepts

MOS	Title	Distributed Training	Training Devices	Civilian Substitution
11B	Infantryman		X	
88M	Motor Transport Operator			X
95B	Military Police	X		X
91A	Medical Specialist	X		X
13B	Cannon Crewman		X	
98G	EW/Signal Intelligence	X		X
94B	Food Service Specialist			X
13F	Fire Support Specialist	X		
54B	Chemical Operations	X		
11M	Fighting Veh. Infantryman		X	
19K	M1 Armor Crewman		X	
16S	MANPADS/STINGER Crewman		X	

promising MOS where implementing new training concepts may prove feasible and cost-effective.

Before new training concepts are implemented in the Army, however, precise strategies for implementing these concepts need to be developed, and the extent of the cost savings and other implications of such changes need to be determined. Analyses along these lines can help determine how to tailor a given concept to an MOS and implement it in the most cost-effective way. Close examination of MOS may reveal several alternative means for reorganizing the content, timing, location, and methods of training consistent with a given training concept.

Based on these considerations, we recommend that the Army proceed with a series of case studies in a small number of MOS to examine the costs, feasibility, and possible implications of implementing new training concepts suitable to the MOS, to be followed by more detailed assessments and evaluations. The analytic results presented in this report can be used to select specific MOS for such detailed study.

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FIGURE

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ACRONYMS

ACE	American Council on Education
AFQT	Armed Forces Qualification Test
AIT	Advanced individual training
AR	Army Regulation
ASI	Additional skill identifier
ASVAB	Armed Services Vocational Aptitude Battery
CASTP	Civilian Acquired Skills Training Program
CIP	Classification of Instructional Programs
CMF	Career Management Field
DA	Department of the Army
DOT	*Dictionary of Occupational Titles*
EW	Electronic warfare
FY	Fiscal year
MLRS	Multiple Launch Rocket System
MOS	Military occupational specialty
MOTD	Military occupational and training data
MPA	Military pay and allowances
NCO	Noncommissioned officer
OMA	Operations and maintenance account
OSUT	One-station unit training
POI	Program of instruction
TADSS	Training aids, devices, simulators, and simulations
TMDE	Test, measurement, and diagnostic equipment
TRADOC	U.S. Army Training and Doctrine Command
USAREC	U.S. Army Recruiting Command

1. INTRODUCTION

BACKGROUND

The U.S. Army will find it increasingly difficult to train its soldiers in the coming years. As defense spending shrinks, pressures to reduce the costs of training will continue to increase. In addition, environmental and political considerations will lead the Army to restrain its use of ranges and maneuver areas. At the same time, continuing technological advances are expected to increase skill requirements and drive up the operating and support costs associated with equipment and maneuver-intensive training. Such trends will force the Army to modify its customary methods of training. Moreover, the Army must respond to these problems in an environment of uncertainty about future changes in Army missions, force structure, and deployment posture, all of which could affect choices among training approaches.

Among the various training activities conducted by the Army, those providing individual military education and training are of particular concern. To prepare its members to perform their wartime missions, the Army performs several major training functions, including individual training and collective training for crews, platoons, companies, and higher echelons (Gorman, 1989). Individual training provides soldiers with job-specific skills and knowledge needed to perform their functions as members of military organizations (Department of Defense, 1989). Individual training is provided both in residence at U.S. Army schools (generally termed "institutional training") and in units during operational assignments through self-development and on-the-job training. Most of the formal, institutional training provided to individual servicemembers is conducted at U.S. Army schools (Department of the Army, 1987).

The Army operates an extensive infrastructure and expends considerable resources providing institutional training in U.S. Army schools. In the active component, for example, institutional training occurs at 27 service schools, located at 17 active-duty training centers (TRADOC, 1984).[1] Considerable manpower is required to conduct individual training in institutions; in fiscal year (FY) 1990, approximately 45,000 military personnel and 31,000 civilians were required to process roughly 117,000 manyears of trainees and students (Department of Defense, 1989, p. VIII-4ff). Costs associated with individual training in institutions are estimated at $7 billion, approximately 10 percent of the total Army budget of $77.7 billion in FY90 (Department of Defense, 1989).

NEED FOR NEW ARMY TRAINING CONCEPTS

Given problems of shrinking training resources, greater constraints, and increasing training requirements, the Army is seeking to define new methods of training that can maintain effectiveness while reducing the resources required to support training. The U.S. Army Training and Doctrine Command (TRADOC) has developed a number of new ideas for conducting training in the future (TRADOC, 1990). Some of these are initial *training concepts*

[1]The Reserve Component also operates an extensive system of U.S. Army Reserve Forces schools and National Guard academies.

that provide a broad and general description of how to train in the future. Others are more detailed *training strategies* that describe the methods and resources required to implement a training concept. The concepts and strategies include the following:

- *Distributed training*, which envisions a reduction in the length of institutional training courses, accompanied by increased individual training at soldiers' home stations using paper-based instruction, video tape, computer-based training, interactive videodisc, and televideo;
- *Device-based training*, which envisions the use of advanced technologies, including training aids, devices, simulators, and simulations (TADSS), to reduce equipment and ammunition usage during training at institutions, combat training centers, and home stations;
- *Civilian training of military skills*, which includes concepts for capitalizing on national training assets in lieu of training provided by military instructors in U.S. Army schools (e.g., through vocational technical training programs, contract training services, or lateral entry programs).

Advocates suggest that such initiatives might permit reductions in the resources required to conduct individual training while maintaining or otherwise improving the quality and timeliness of training. Clearly these concepts and strategies would significantly change the way that individual training is currently conducted in U.S. Army schools. Because these changes could have far-reaching effects on soldier proficiency and Army capability, thorough assessment is needed. Training policymakers need information on several key questions such as the Army training programs in which these concepts would be implemented, how changes in training would be implemented, the cost savings that would be achieved, and other consequences of such changes.

LINKING TRAINING CONCEPTS TO TRAINING PROGRAMS

Initially the Army needs to identify how new training programs and concepts would be accommodated within the U.S. Army school system. Army schools develop strategies and products to support training of officers, warrant officers, and enlisted personnel (Department of the Army, 1987). These broad occupational classifications contain a large number of specific occupational specialties. The training courses conducted by Army schools are tied to these occupations. They provide, for example, entry-level and advanced training of job-specific skills.

However, Army occupations—and the training courses associated with them—are numerous and extremely heterogeneous. They occur within different branches of the Army (e.g., infantry, engineering, or medical), cover a variety of weapons and support systems, and differ in the complexity of required skills (e.g., operations vs. maintenance). Some jobs have unique military significance (e.g., in conducting combat operations), while others are similar to jobs in civilian organizations (e.g., in providing clerical or service functions). Thus, attempts to broadly reorganize the organization and delivery of Army institutional training should identify specific occupations and training courses that lend themselves to given training concepts.

Given differences among the requisite skills, knowledge, and abilities required to perform the wide range of Army occupations, no single training concept or strategy is likely to be suitable

for all military occupations and related training courses. Rather, some concepts (e.g., distributed training) may be suitable for certain occupations and training courses, while others (e.g., civilian training) may be more suitable in other cases. Other occupations may be amenable to a mix of concepts (e.g., using contract trainers and training devices).

RESEARCH OBJECTIVES AND MAIN FINDINGS

This research seeks to link new Army training concepts for changing institutional training programs in the future to specific occupations and training courses. It represents an initial research task of a larger research effort whose goal is to analyze, across a range of occupations, alternative training approaches that may be more affordable and flexible than current techniques for conducting Army individual skill training.

Using data compiled specifically for this research,[2] the analysis described in this report examines training-related characteristics of Army occupations and identifies general training-related dimensions that characterize Army entry-level enlisted military occupational specialties (MOS). We find the principal training-related dimensions of enlisted entry-level MOS to include ability requirements, dominant task characteristics (procedural or verbal), similarity to civilian occupations, and resource intensity. The dimensions can be linked to new training concepts under consideration by the Army (i.e., distributed training; use of training aids, devices, simulators, and simulations; use of civilian training sources). We find these results useful as a basis for suggesting MOS in which given training concepts and strategies may prove most feasible and cost-effective.

PLAN OF THE DOCUMENT

The next section of this report describes the analytic approach taken in this research. Our findings describing general training-related dimensions of Army MOS and linking these to new Army training concepts are described in Section 3. In Section 4, we discuss methods of setting priorities for implementing new training concepts in enlisted entry-level MOS. Finally, Section 5 describes the conclusions we have reached in conducting our analysis. Detailed rankings of MOS on general training-related dimensions are included in the appendices.

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[2]The dataset developed for this research is described in a companion document (Kirin and Winkler, forthcoming).

2. RESEARCH FRAMEWORK

OVERALL APPROACH

This section describes our general approach and the specific steps taken in the research. The goal of our analysis was to explore relationships between new Army training concepts for conducting individual training and the training programs in which these are expected to be implemented. We focus on the training concepts and strategies identified in Army doctrinal publications as holding the greatest potential for reducing costs of individual training in institutions (TRADOC, 1990). They are distributed training, expanded use of TADSS, and increased reliance on civilian education and job experience, as described in the previous section.

In conducting this research, we focus on individual training programs conducted in institutions that provide job-related skills. These are linked closely to Army occupations. But given the scope and diversity of Army occupations, further analysis is needed to distinguish among occupations and relate these to the training concepts under consideration. Furthermore, given the substantial changes to institutional training implied by these concepts, priorities need to be established for implementing these concepts within specific occupations and training courses. Because cost reduction is a key objective, efforts to implement these concepts might focus initially on the occupations and courses in which more sizable savings are likely to be captured.

RESEARCH STEPS

We conduct a number of analyses within this framework. We focus further analysis on the most diverse and resource-intensive programs—those that provide entry-level training to Army enlisted personnel.

We next identify and obtain measurable training-related characteristics of Army entry-level enlisted occupations. We conduct empirical analyses designed to reveal general occupational dimensions derived from these measures.

We then seek to relate these occupational dimensions to new Army training concepts (distributed training, expanded use of TADSS, and increased reliance on the civilian sector). Finally, we consider ways to identify suitable entry-level MOS training courses and set priorities among these for implementing new training concepts.

Programs of Individual Military Education and Training

Although a detailed description of the structure and organization of Army individual training is beyond the scope of this document, below we describe briefly key distinctions among programs of individual training and education that are germane to new training concepts. In common usage and for budgeting purposes, the following categories are usually used to distinguish Army individual training that occurs in institutions:

- *Recruit training,* which imparts basic soldiering skills and indoctrination to enlisted personnel at initial entry into military service;
- *Specialized skill training*, which imparts skills and knowledge needed in specific jobs to officers and enlisted personnel. An initial phase prepares personnel for their initial duty assignment. Subsequent phases prepare soldiers for positions of increased responsibility;
- *One-station unit training* (OSUT), a combination of recruit training and specialized skill training in a single course;[1]
- *Flight training*, a separate category of specialized skill training, primarily for pilots and navigators;
- *Officer acquisition training*, which occurs prior to the commissioning of officers into an initial operational assignment (e.g., at the U.S. Army Military Academy, the Reserve Officer Training Course, or Officer Candidate School);
- *Professional development education,* which imparts academic, functional, or advanced military topics to Army leaders (e.g., at the national defense academies or nonmilitary educational institutions).

Among the various categories of training provided in Army training institutions, specialized skill training of officers and enlisted personnel absorbs the largest share of Army individual training costs and training workload. In FY90, specialized skill training accounted for $1.532 billion (21 percent) of the $7.377 billion spent by the Army to train individuals on active-duty status at active Army training establishments (Department of Defense, 1989, p. IX-4).[2] When measured as student/trainee manyears, specialized skill training accounted for 59 percent of the Army's training workload in FY90 (Department of Defense, 1989, p. I-8).[3]

Specialized skill training, in turn, is composed of several subcategories encompassing initial skill, skill progression, and functional training for both enlisted personnel and officers. For enlisted personnel, initial skill training, frequently referred to as advanced individual training (AIT), consists of formal institutional training to qualify the trainee for an entry-level position in the occupational structure. The occupational structure is organized as separate, recognizable job categories known as military occupational specialties. The Army trained 242 entry-level occupations for active-duty enlisted personnel as of FY90. The entry-level courses vary in length, depending on the nature and complexity of the occupation.

Initial skill training for officers has a similar objective—to prepare officers for their initial duty assignment. Compared to AIT, however, these courses provide less emphasis on vocational education and greater emphasis on general education, integrating leadership skills and military doctrine. Skill progression training for officers and noncommissioned officers (NCOs) emphasizes leadership or supervisory responsibilities, providing trainees with ad-

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[1]OSUT combines basic training and specialized skill training in one course at one location. After graduation, the soldier is qualified in the occupation and assigned directly to a unit.

[2]For the remaining categories, FY90 funding was as follows: recruit training ($383 million), OSUT ($128 million), flight ($345 million), and professional development ($192 million). The remainder was earmarked for various travel, support, and management costs. Base operations support and direct training support accounted for $2.191 billion, $1.018 billion was allocated for travel and moving costs, $793 million for Reserve Component Pay and Allowances, and so forth.

[3]The workload associated with basic training and OSUT is also substantial, accounting for 16 and 11 percent of the training of active forces in the Army, respectively (Department of Defense, 1989).

vanced skills and the knowledge needed for more increased responsibilities (e.g., for command and staff duties). Finally, functional training covers "other" subjects that impart additional skills that are not occupationally specific. This could include, for example, Army Ranger or language training.

Cost estimates are not readily available for subcategories of specialized skill training, but workload estimates indicate the magnitude of required training resources. Figure 2.1 shows the manyears of trainees and student loads associated with this form of training in FY90. Most of the Army's training workload is associated with enlisted personnel.[4] Smaller workloads are associated with officer training. Moreover, most of the training workload is associated with initial skill training.

The foregoing discussion indicates that if cost reduction is a key goal of new Army training concepts, specialized skill training of officers and enlisted personnel presents a large and promising area to consider new training concepts and strategies. Moreover, enlisted initial skill training (AIT and OSUT) would be an especially fruitful area on which to focus attention, given the expense and workload associated with these forms of training. Changes to these forms of training could provide significant savings.

Enlisted initial skill training is problematic for new training concepts, however, because of the diversity of the occupations and associated training courses. They vary considerably in size, length, and nature of skills. The basis for selecting training concepts within an MOS is

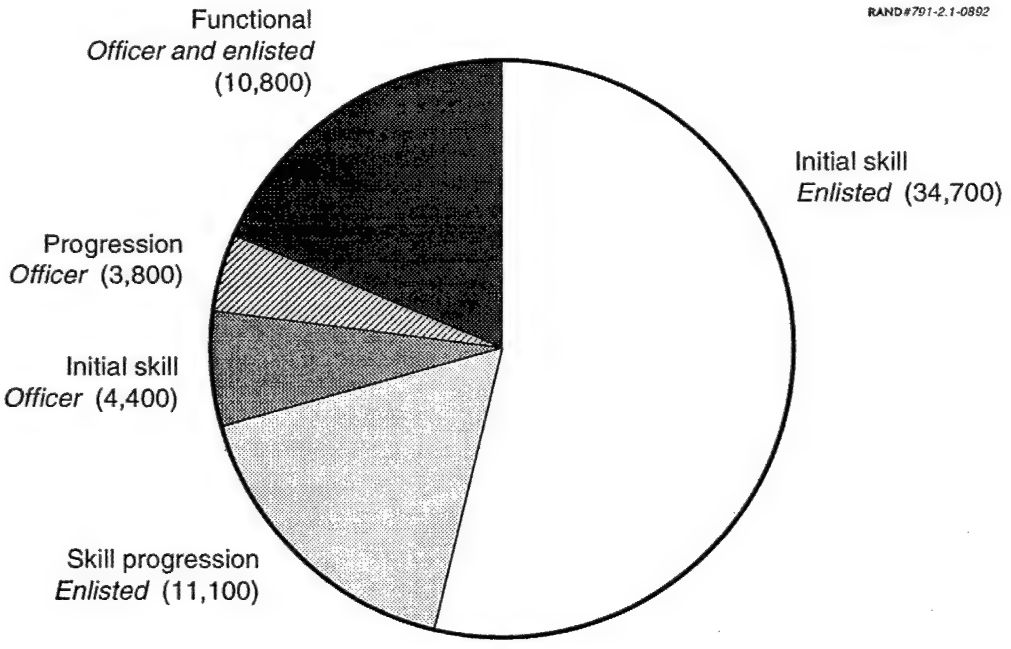

Figure 2.1—Student/Trainee Manyears for Specialized Skill Training

[4]The workload and resources are even larger than indicated here, considering the portions of OSUT that are devoted to initial skill training.

not obvious. Some MOS may lend themselves to more than one concept. Given the magnitude of resources and possible savings from implementing new concepts in courses such as these, further analysis is needed to distinguish Army entry-level enlisted occupations and link these with new Army training concepts.[5]

Empirical Analysis of Army MOS

Ideally, previous literature on occupational classification might suggest ways to differentiate Army MOS and relate them to training concepts or strategies. Our research next examined previous literature on occupational classification to identify useful categorization schemes, data, and methodological approaches. Unfortunately we found that the professional literature provided no ready basis for organizing Army occupations according to training-related characteristics. Neither did we find a body of research that contrasted methods for conducting training across occupations (e.g., with respect to training content, timing, location, or media).

However, studies of both civilian and military occupations identified measures that could be useful for analyzing training of Army MOS. In general, the research highlights the importance of two types of information for developing occupational classifications relevant to training development. The first consists of the tasks, duties, or broad functions associated with the jobs or occupations. The second includes information characterizing the skills, behaviors, and/or traits of individuals holding the jobs (McCormick, 1976; Pearlman, 1980).

The literature also suggests methods for analyzing occupations to form homogeneous groups. Ideally, a classification scheme should be developed by identifying the goals of classification, along with any theoretical basis that may exist for guiding training development and the key dimensions on which the occupations will be grouped. Next, a set of characteristics to be measured would be identified and a measurement technique developed. In practice, however, few schemes can be developed in this manner. Usually an exploratory effort is required, beginning with the measurement of a set of available occupational characteristics, followed by an exploratory, data-driven classification analysis. This analysis typically reveals similarities among the job characteristics measures and permits aggregation based on several primary characteristics. This "bottom-up" approach may allow the data to inform the classification scheme without any a priori restrictions or biases that might constrain the resulting classification.

Previous research also suggests the appropriate level of detail in occupational data for the purpose of analysis. Much of the research linking problem domain/characteristics and individual learning behaviors with training strategies has focused on highly detailed attributes, with corresponding attention to minute details of training program design (e.g., Glaser, 1966; Briggs, 1968). To distinguish between broad training approaches (rather than specific curricula), however, a broader view of problem domain (i.e., job content and corresponding individual attributes) is needed. This consideration further supports the use of a "bottom-up"

[5]We do not mean to imply that these training concepts are potentially unsuitable or not cost-effective for other types of training (e.g., flight training or other specialized skill progression or functional courses). Such concepts may indeed have merit and further analysis would be helpful, especially for functional courses. Our point is that specialized skill training (initial entry enlisted) is "where the money is," and these courses are extremely heterogeneous, making the development of training strategies more difficult.

exploratory approach in which a variety of data is included that can be theoretically and practically justified.

With the foregoing considerations in mind, we selected a number of measures for further analysis from a larger dataset (described in Kirin and Winkler, forthcoming). That dataset contains information describing entry prerequisites, characteristics of jobholders and entry-level training courses (including measures of resource utilization), and the nature of work performed in all Army MOS as of the beginning of FY90. Here we confine our attention to training-related data concerning the 242 MOS authorized for active-duty entry-level training.

The next step of the analysis uses formal statistical procedures to uncover empirical "dimensions" that underlie the characteristics. To structure the analysis, we used factor analysis (Harman, 1976) to reduce a number of training-related characteristics of MOS to their basic dimensions. Our analysis is intended to identify whether a smaller number of general dimensions can summarize a larger number of training-related characteristics of Army MOS. Our approach balances quantitative and qualitative considerations, in which statistical analyses serve as an exploratory tool for grouping and ranking Army MOS.

Whereas factor analysis identifies the general dimensions that underlie a set of measures, the MOS (or other units so analyzed) may be compared by calculating scores on each factor for each MOS. Thus, our factor analytic results are used to score each MOS relative to the factors that may emerge from the analysis.

Linking Occupations to Training Concepts

Next our analysis seeks to link occupational dimensions and specific MOS to new Army concepts and strategies for training. This requires assumptions about relationships between occupational characteristics and training design. For example, Army publications distinguish between MOS with respect to their technical complexity and uniqueness to the Army (e.g., TRADOC, 1990). These documents, and other available literature, suggest the following relationships between general characteristics of Army occupations and possible new approaches for training:

- MOS with a "high degree of correlation with the civilian sector" should be suitable for civilian vocational technical training, contract training, or lateral entry programs;
- Occupations that involve cognitive and informational skills should be appropriate for training approaches involving "distance learning" technologies (i.e., distributed training);
- Occupations that emphasize procedural and manipulative tasks should lend themselves to training with the use of training aids, devices, and simulators.

Such general dimensions, should they be empirically verified, provide a starting point for selecting exemplary MOS for these training concepts. Given the large number of MOS, however, priorities need to be set for implementing the training concepts. Consistent with the Army's goal of reducing the cost of training, we suggest resource intensity as an additional training-related dimension of Army MOS. This dimension could then be used along with the other general dimensions to classify and set priorities among MOS with appropriate characteristics for considering new training concepts and strategies. That is, once the more re-

source-intensive training courses are identified, MOS may be considered as suitable for specific training strategies such as distributed training, substitution of civilian education or job experience, and use of TADDS or other strategies that may be suggested by the analysis. Our framework, described in detail in Section 4, considers criteria that may be used to identify MOS in which new training concepts may prove most cost-effective.

LIMITATIONS OF THE ANALYSIS

The remainder of this report describes the results of our analyses of training-related characteristics of MOS and their potential relationship to new Army training concepts for conducting individual training. These analyses contain a number of limitations. First, in keeping with the "bottom up" nature of the empirical analysis, the general dimensions revealed by the factor analysis reflect the quality of data available for analysis and the relationships among them. Were additional data to be made available, or major new sources of relevant data identified, the number and nature of the general dimensions could change.

A second limitation of the analysis results from the state of research on occupational classification and training development. The available research is limited, and more research is needed to refine training concepts and relate them to occupational characteristics. This is true of both military and civilian research on occupational classification and training development. For these reasons, this research should be viewed as exploratory and suggestive in linking various training concepts to MOS. Further analysis is needed that refines new Army training concepts, suggests strategies for implementation, and assesses the costs and consequences of changing training programs.

3. TRAINING-RELATED DIMENSIONS OF ARMY OCCUPATIONS

In this section, we describe statistical analyses used for training characteristics of Army enlisted entry-level MOS. We first describe the measures selected for analysis and then present our results. In the next section, we apply the results of the analysis to link training concepts to general dimensions and specific MOS.

SELECTION OF MEASURES

In keeping with the exploratory nature of this analysis, we began by identifying major training-related characteristics of Army MOS that could relate to the organization and delivery of training. Consistent with our discussion in the previous section, we sought to include a number of measures that could influence the design and organization of training courses. Broadly, these characterize the occupation with respect to aptitudes of jobholders, tasks performed in the occupation (including similarity to civilian jobs), and training resource intensity. Our final set of measures is summarized in Table 3.1. We describe each measure in detail below.

Aptitude and Education

Because military jobs vary in their technical difficulty and to avoid the costs of "washing out" large numbers of recruits in the more complex MOS, the Army uses general and specific vocational aptitudes as primary determinants for setting recruiting standards and guiding recruits to specific occupations. Numerous studies have supported the proposition that (1) different tests of intellectual aptitude tend to be highly correlated; (2) consistent differences in aptitudes occur among individuals; and (3) differences in individual aptitude are associated with job performance.[1] We therefore assume that MOS might be arrayed according to differences in aptitude among jobholders and associated educational requirements. Measures in our analysis include the following:

Average AFQT Score. All potential enlistees in the military services are administered a written battery of tests, the Armed Services Vocational Aptitude Battery (ASVAB). The ASVAB contains a number of specific tests of vocational aptitude (described in Kirin and Winkler, forthcoming), several of which are combined to form a test of general training aptitude, the Armed Forces Qualification Test (AFQT). Results of the AFQT are converted to percentile rankings, ranging from 0–99, normed on the U.S. youth population. The Army sets overall recruiting targets based on AFQT score while seeking to draw the highest possible share of recruits who score in the upper half of the AFQT distribution. Consistent differ-

[1]See, for example, Orvis, Childress, and Polich (1992); Winkler, Fernandez, and Polich (1992).

Table 3.1

Measures Used in the Analysis

Measure	Mean	Standard Deviation
Average AFQT score (actual)	61.56	10.32
Aptitude target percentage	68.86	15.49
Minimum score required on ASVAB (standardized score)	–0.48	0.58
Percentage of applicants scoring above required ASVAB score	75.86	13.28
Educational requirement for acceptance (1 = yes; 0 = no)	0.36	0.71
Data (1) or things (0) dominant (from the *Dictionary of Occupational Titles,* DOT)	0.26	0.43
Number of information tasks	9.56	9.19
Number of manipulative tasks	9.18	8.08
Ratio of information to manipulative tasks	–0.01	0.54
Number of additional skill identifiers (ASI) available in the MOS	1.09	1.40
Existence of primary civilian occupation (DOT) (1 = yes; 0 = no)	0.85	0.35
Number of alternative civilian occupations	1.07	1.25
Combat-related MOS (1 = yes; 0 = no)	0.14	0.34
Inclusion in Civilian Acquired Skills Training Program (CASTP) (1 = yes; 0 = no)	0.40	0.49
Number of Classification of Instructional Programs (CIP) codes	2.05	1.67
Vocational educational credit recommended (1 = yes; 0 = no)	0.61	0.49
Academic educational credit recommended (1 = yes; 0 = no)	0.64	0.48
Hours of associate credit recommended	5.23	6.25
Hours of vocational credit recommended	4.55	5.26
Number of personnel trained in FY89	487.94	1073.71
Length of AIT training	78.14	55.17
Variable manpower training costs	10646.82	8590.79
Variable operating/maintenance training costs	6409.81	5966.28
Other variable training costs	195.62	462.72

ences are found, however, among MOS in the average AFQT scores of personnel.[2] The average AFQT score (actual) refers to that for recruits in each MOS for FY89, as recorded by the U.S. Army Recruiting Command (USAREC).

Aptitude Target Percentage. Although AFQT score is not *directly* used to assign personnel to specific MOS for recruiting purposes, the Army develops general target goals with respect to the distribution of training aptitude within each MOS. The target goals specify a desired proportion of "high aptitude recruits" whose AFQT scores fall in the top half of the distribution. USAREC then tracks the aptitude distribution of recruits within each MOS to

[2]For example, the average AFQT score of a court reporter (MOS 71E) is 97, while the average score of an infantryman (MOS 11B) is 58.

guide their recruiting efforts. This measure indicates the target percentage of "high aptitude" personnel in each MOS, as set by USAREC in FY89.

Minimum Score Required on ASVAB. The purpose of the ASVAB is to identify vocationally relevant strengths as measured by functionally related subtests (e.g., electronics, field artillery, general mechanical, etc.). Qualification for acceptance in an entry-level MOS requires a minimum score on at least one ASVAB composite subtest. This measure is the minimum score required on the primary qualifying ASVAB composite, as recorded in AR (Army Regulation) 611-201 (Department of the Army, 1989a). To permit comparison of qualifying scores across different subscales, the raw ASVAB composite cutoff scores were converted to comparable standardized values by subtracting the population mean and dividing by the population standard deviation for that subscale, as indicated in records maintained by the Defense Manpower Data Center for FY89.

Percentage of Applicants Scoring Above Required ASVAB Score. This measure shows, for each MOS, the proportion of all Army recruits taking the ASVAB who can be expected to achieve the minimum qualifying score on the primary composite for that MOS (Eitelberg, 1988). This measure would be expected to be monotonically negatively related with the previous measure. Because this and the previous measures came from separate sources and are potentially subject to different sources of error, it is appropriate to use them as separate measures in a factor analysis.

Educational Requirement for Acceptance. This measure was also obtained from AR 611-201. It indicates whether, for each MOS, formal educational prerequisites exist; these include the minimum enlistment criteria, high school diploma, or postsecondary education. The vast majority of enlisted MOS require only high school diplomas or no formal education requirements; thus, this measure serves to distinguish jobs that require high school diplomas or more advanced academic preparation from those not requiring a high school diploma.

Job-Related Tasks

Occupations may be distinguished with respect to the nature and type of tasks performed. At the level of the individual Army occupation, tasks are very specific (e.g., "operate 3 KW generator set"). For comparing occupations, more general descriptions of tasks would be desirable. Unfortunately, only a few such general distinctions exist (e.g., through the DOT); thus we developed additional indices for this research.

Data or Things Dominant. This measure was derived from the DOT code, using the *Military Civilian Occupational Crosscode* assignment of principal DOT code (Department of Defense, 1988; U.S. Department of Labor, 1982).[3] Fields 4–6 of the DOT code represent the "total level of complexity at which the job requires the worker to function" with respect to (1) data, (2) people, and (3) things. For those MOS assigned a primary DOT code, we used information on the degree of interaction specified with data, people, and things to indicate the nature of tasks required in each of these domains in the corresponding MOS. Based on examination of MOS distributions, we were convinced that the people complexity variable had little meaningful variation for entry-level enlisted personnel, who would not be expected, for

[3]Kirin and Winkler, forthcoming, discusses these data in greater detail.

example, to supervise others, and we did not consider it further.[4] We further refined the remaining measures of data and things complexity by creating a single index, which we termed data or things dominant. We reasoned that "data dominant" MOS required a preponderance of cognitive skills compared to MOS with "things dominant," which indicated the importance of manipulative skills. This measure was coded "1" if the degree of data complexity exceeded the degree of things complexity or "0" otherwise.

Tasks Performed by the MOS. The next three measures were derived specifically for this research using information contained in AR 611-201. These measures relied on expert ratings of Army officers, who first noted which of the tasks listed under each MOS in AR 611-201 were "common" to all MOS.[5] The raters then judged the remainder as "primarily manipulative" or "primarily informational." The rating distinguishes tasks that require cognitive and verbal skills from those that require motor skill, manual dexterity, or hand-eye coordination. The measures were found to be reliable for comparative purposes (agreement rate of 83 percent), as described in detail in Kirin and Winkler, forthcoming.

Number of Information Tasks. This measures the number of tasks listed under the job description of a specific MOS in AR 611-201 that are primarily "informational" in content. Examples of informational tasks are "prepares suspense control documents and maintains suspense fields" and "prepares requests for issue and turn-in."

Number of Manipulative Tasks. This measure indicates the number of tasks that are "manipulative" in content among those listed under the job description for a particular MOS. Examples of manipulative tasks are "services and lubricates helicopters and helicopter subsystems" and "erects antennas."

Ratio of Information to Manipulative Tasks. This measures the relative dominance of informational and cognitive tasks to manipulative and procedural tasks for a particular MOS based on the preceding two measures. Where INFO represents the number of information items and MAN represents the number of manipulative items, this measure was calculated as:

$$(\text{INFO} - \text{MAN}) / (\text{INFO} + \text{MAN}).$$

This measure thus achieves a value of 1 or –1 if the subscale is composed entirely of informational or manipulative items, respectively, and a value of 0 when they are present in equal proportions.

Number of ASI. We reasoned that an MOS with many ASIs could entail a wider variety of specialized skills than those with few or no ASIs.[6] We thus included the number of ASIs approved for each MOS as a further potentially relevant measure.

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[4]It is a fair assumption that all entry-level jobs should be rated "8" for "people," which equates to "takes instructions—helping."

[5]This distinction was made using the *Soldier's Manual of Common Tasks, Skill Level 1*, U.S. Army Field Manual 21-2.

[6]ASIs represent areas of functional expertise for which training is provided to selected members of the MOS in subsequent training courses. For example, infantrymen (MOS 11B) can receive subsequent training as "sniper" (ASI B4), "dragon gunner" (ASI C2), or five additional areas of specialization.

Measures of Similarity to Civilian Occupations

These measures were selected to indicate the relationship between tasks performed by Army MOS and those associated with civilian occupations.

Existence of Primary Civilian Occupation. This measure was drawn from the *Military-Civilian Occupational Crosscode* (Department of Defense, 1988) and reflects the existence of a primary DOT code associated with an MOS. According to our database, a closely analogous civilian occupation exists for approximately 85 percent of the MOS.

Number of Alternative Civilian Occupations. The *Military-Civilian Occupational Crosscode* permits an MOS to have up to five corresponding civilian occupation codes. When this occurs, one is designated the primary or most closely corresponding civilian occupation (see above). The remaining ones are designated alternative civilian occupation codes. This measures the number of alternative civilian occupation codes associated with an MOS.

Combat-Related MOS. This is a dummy variable, coded "1" for combat-related MOS and "0" otherwise. This measure was derived from the branch assignment of each MOS in the Army personnel management structure. It includes occupations from various Career Management Fields (CMF), where the CMF are judged by the Army to be primarily composed of combat, combat support, or combat service support occupations for management purposes. For example, all MOS in CMF 19, Armor, are managed by the combat arms directorate of the Enlisted Personnel Management Directorate. In general, we considered combat-related MOS, e.g., Armor crewman, to be less likely to have civilian counterparts, though this is not a perfect measure.[7] We thus considered this measure as a negative indicator of civilian similarity.

Inclusion in the CASTP. This is also a dummy variable, coded "1" for MOS that are included in the Army CASTP, which offers accelerated promotion and waiver of advanced individual training in qualifying occupations. If an MOS was included in the CASTP, as defined by AR 601-210 (Department of the Army, 1990), it was assigned a score of "1"; otherwise, it was assigned a score of "0." In general, inclusion of the occupation in the CASTP indicates that an individual could have appropriate civilian-sector skills, training, and work experience, although criteria for inclusion in the program, or defined levels of acceptable work experience, are not clear.[8] Because it is unlikely that purely military skills would be learned in the civilian sector, we considered this measure as an indicator, though not necessarily a perfect measure, of civilian exchangeability.

Number of CIP Codes. This measure is also drawn from the *Military-Civilian Occupational Crosscode* (Department of Defense, 1988), which indicates whether a civilian instructional program exists for each associated DOT code. This measure indicates the number of CIPs for each MOS based on the number of associated DOTs and hence serves to reinforce measures based on the DOT as indicators of transferable skills.

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[7]For example, some MOS within a CMF managed as a combat career division may not be immediately recognizable as a combat MOS. However, of the 32 MOS rated as "combat," 28 have no associated DOT code; thus, we regard this measure as one of several useful indicators of civilian similarity.

[8]All of the 99 occupations in the CASTP have an associated DOT code. Questions about criteria for inclusion pertain more to MOS with civilian counterparts that are not included.

Vocational Educational Credit Recommended. This measure is one of four derived from information contained in *The 1988 Guide to the Evaluation of Educational Experiences in the Armed Services*, published by the American Council on Education (ACE, 1989). The original data indicate for each MOS whether servicemen are recommended for formal academic credit subsequent to service for their MOS-related training and duty. Credit is broken down by the number of academic credit hours applicable at the associate, bachelors, and graduate levels, and the number of vocational educational credit hours. This measure was created by coding a "1" if an MOS was provided any amount of vocational educational credit.

Academic Educational Credit Recommended. This measure is analogous to the one above but is coded "1" for MOS categories that are recommended for academic credit subsequent to service in the Army at either the associate, bachelors, or graduate level.

Hours of Associate Credit Recommended. This measure further quantifies the academic educational credit suggested by ACE for MOS-related training and work experience. We reasoned that MOS for which increased levels of credit are recommended would tend to be more exchangeable with civilian occupations. Examination of the data, however, revealed that only a small number of entry-level MOS (six or less) are recommended for baccalaureate or graduate credit, and most are recommended for credit at the associate level. Hence, this measures the number of hours of associate credit recommended for the MOS.

Hours of Vocational Credit Recommended. For those MOS recommended for vocational credit, this measure indicates the number of hours recommended by ACE.

Training Resource Intensity

These measures characterize the organization and delivery of courses providing entry-level training for the occupation. They include measures of the resources required to train each MOS.

Number of Personnel Trained in FY89. The Army must provide pay and other allowances to each trainee, as well as food, shelter, transportation, and a variety of in-kind services. Thus, the number of trainees in an MOS can be one indicator of Army costs associated with MOS training in an occupation. This measure indicates the number of entrants who required training in each MOS during FY89. It was obtained from the *Force Management Book, Fiscal Year 1989*, prepared by the U.S. Total Army Personnel Command.

Length of AIT Training. A related additional indicator of the costs and resources required to conduct training in an MOS is the length of training required. The longer the course, the greater the direct and indirect costs required to conduct it. This measure, derived from the *Army Formal Schools Catalogue*, DA Pamphlet 351-4 (Department of the Army, 1989b), indicates the length in calendar days of specialized skill training associated with each MOS.[9]

The remaining three measures represent cost estimates to train each graduate in each entry-level course, based on data provided by TRADOC's Deputy Chief of Staff for Resource Management. These data estimate *variable* costs per graduate, net of fixed costs associated with each training course, based on reports provided by the training schools. Fixed and vari-

[9]For OSUT training courses, this measure includes only the portion devoted to advanced individual training.

able costs are then estimated by TRADOC using a linear regression model of the form $y = a + bx$, where a represents the fixed or "flat-rate" costs per MOS that do not depend specifically on the number of personnel trained and b estimates the variable portion attributable to each graduate.[10] The database contains three measures of variable cost: manpower, operating/maintenance, and other.

Variable Manpower Training Costs. These are the estimated variable costs associated with the personnel required to support training, including the costs of instructors and pay and allowances of trainees, calculated on a per-capita basis.

Variable Operating/Maintenance Training Costs. Variable operating/maintenance training costs include operating and maintaining training equipment and physical facilities, calculated on a per-capita basis.

Other Variable Training Costs. This measure reflects variable training costs that are not related to the costs of manpower or operating/maintenance, calculated on a per-capita basis. Examples of costs in this category include the procurement of training aids or contract services.

ANALYTIC METHOD

Factor Analysis

We conducted factor analysis using the principal components analysis method.[11] We structured the data described in Table 3.1 as a rectangular array and calculated correlations between each pair of measures. Only factors with an eigenvalue greater than or equal to 1.0 were considered in determining the number of factors. These eigenvalues were then evaluated by the "scree" and "discontinuity" tests (Rummel, 1970).[12] For maximum interpretability, all factor solutions were rotated according to the varimax criterion (Harman, 1976).[13]

We defined a factor in terms of the measures that loaded most strongly on it.[14] By convention, we considered measures with loadings ≥ 0.50 or ≤ -0.50 as primary indicators for defining a factor.[15] This criterion requires that the factor account for at least 25 percent of the variance of a defining measure.

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[10]These estimates of training cost are subject to certain limitations, as discussed by Way-Smith, forthcoming. They are, however, the most comprehensive estimates of training cost maintained for management purposes by TRADOC. While one should be cautious in regarding these estimates as *exact* measures of training cost, they should be useful for the purposes of making relative cost comparisons among MOS.

[11]All factor analyses were performed using the SAS program PROC FACTOR (SAS Institute, 1985).

[12]The scree test plots the eigenvalues associated with each successive factor and looks for a leveling off in the plot. The point at which the leveling occurs is taken as the point after which factors are more likely to reflect error variation. The discontinuity test is similar but looks for a discontinuity or sharper drop in eigenvalue magnitude relative to previous or subsequent eigenvalues (Rummel, 1970, pp. 361–365).

[13]During this analysis, we also examined the robustness of our emerging results using maximum likelihood factor analysis, a different factor analytic technique (Lawley and Maxwell, 1971; Joreskog, 1967). The results of those analyses corresponded to those of the principal components analysis.

[14]The correlation of a measure with a factor is referred to as that measure's loading. Factor loadings range in value from 1 (perfect positive correlation) to –1 (perfect negative correlation).

[15]Lesser loadings, of course, may also help to interpret the meaning of a factor.

Calculation of Factor Scores

We next use the results of the factor analysis to calculate scores on each factor for each MOS. To do this, we use composite factor scores (Rummel, 1970). By this method only measures with large positive or negative loadings are used to estimate factor scores, and these measures are usually given unit (1 or –1) weights. We used this method to calculate factor scores because we wanted the most important factor weightings to determine the factor rankings.[16]

We calculated composite factor scores using the same measures that we previously used to define each factor. That is, measures were included in calculation of a factor score if the absolute value of their loading on that factor equaled or exceeded 0.50. To calculate factor scores, we first converted measures to standard scores (z-scores) with means of zero and standard deviations of one. We then multiplied the z-score for each qualifying measure by 1 or –1, depending on whether its loading on the factor was positive or negative, summed these products, and divided the result by the number of measures used to calculate the factor score.

RESULTS OF FACTOR ANALYSIS

The analyses yielded a seven-factor solution. The factors are summarized in Table 3.2. To further understand the meaning of the factors and their potential implications for training, we rank ordered all MOS on all factors based on their scores on each factor. The measures and weights used to construct factor scores are shown in Table 3.3. In the following discussion, we interpret each factor as a "general training-related dimension," illustrating each general dimension with MOS with the most extreme scores. Appendix A provides complete rankings of all enlisted entry-level MOS on all factors.

Ability Requirements (Factor 1)

The first factor (accounting for 17.3 percent of the combined variance) is defined primarily by five measures: (1) minimum score required on primary ASVAB composite; (2) percentage of applicants scoring above required ASVAB score; (3) target percentage for accessions scoring in the top half of the distribution of AFQT scores; (4) average AFQT score of soldiers enlisting in the MOS; and (5) presence of a minimum educational requirement. Note that the second of these measures has a negative loading, whereas the others have positive loadings. This happens because the higher the required ASVAB score for an MOS, the lower the percentage of Army personnel who attain or exceed it.

We interpret this factor as representing a general training-related dimension of MOS, which we term *Ability Requirements*. This general dimension of Army MOS is consistent with results of other factor analyses of measures of aptitude and ability, which typically find a gen-

[16]Two other methods are also frequently used to calculate factor scores. One obtains exact factor scores as weighted composites of all individual measures, with weights determined by factor loadings in conjunction with a multiple regression model. The other selects only one or more theoretically important measures to represent each factor. Each has disadvantages, however. The use of basic indicators could produce large numbers of ties on factor scores, especially if nominal (0/1) measures were included. Exact factor weightings can be misleading due to the inclusion of numerous small loadings that may reflect chance.

Table 3.2

Results of Factor Analysis

Measure	Factor						
	1	2	3	4	5	6	7
Required ASVAB Score	0.88	–0.02	–0.16	0.16	–0.07	0.09	–0.11
Pct. of Applicants Scoring Above Req. ASVAB Score	–0.88	–0.01	–0.04	–0.10	0.10	–0.15	0.02
Target AFQT Percentage	0.85	–0.10	0.18	0.15	0.14	–0.18	–0.00
Average AFQT Score	0.85	–0.04	0.19	0.15	0.13	–0.22	–0.04
Educational Requirement	0.51	0.21	0.14	0.23	0.04	–0.25	–0.00
Length of AIT Training	0.47	0.12	–0.20	0.37	0.42	–0.14	–0.11
Primary Civ. Occupation	0.11	0.82	–0.02	0.06	0.12	0.10	–0.15
Combat-Related	–0.16	–0.82	–0.01	0.06	–0.03	–0.02	0.17
No. of CIP Codes	–0.18	0.73	0.25	0.02	0.12	–0.03	0.15
No. of Alt. Civ. Occup.	–0.27	0.69	0.12	0.14	–0.08	–0.01	0.24
Inclusion in CASTP	–0.19	0.47	–0.21	–0.14	0.45	–0.19	–0.18
Other Variable Tng. Costs	–0.15	–0.42	–0.03	0.02	0.26	–0.12	0.15
Ratio of Info./Manip. Tasks	0.27	0.12	0.87	–0.01	0.06	–0.02	–0.14
No. of Information Tasks	0.01	0.24	0.70	–0.16	0.10	0.09	0.11
Data Dominant (vs. Things)	–0.17	–0.00	0.58	–0.03	0.13	–0.33	0.15
No. of Manipulative Tasks	–0.32	0.19	–0.48	–0.05	0.10	0.01	0.37
Var. Manpower Tng. Costs	0.24	0.06	–0.08	0.91	0.07	0.01	–0.03
Var. Op./Maint. Tng. Costs	0.33	–0.03	–0.06	0.88	–0.02	0.14	–0.09
Rec. Hrs. of Assoc. Credit	0.13	0.08	0.11	0.02	0.89	0.17	–0.06
Academic Educational Credit	0.02	–0.06	0.27	0.07	0.70	0.26	0.14
Voc. Educational Credit	–0.23	0.02	–0.01	0.06	0.04	0.87	0.04
Rec. Hrs. of Voc. Credit	–0.01	0.11	–0.09	0.04	0.32	0.80	–0.06
Number of ASIs	0.11	–0.01	0.01	–0.06	–0.00	–0.01	0.83
Number of FY89 Graduates	–0.20	–0.16	0.01	–0.05	–0.01	–0.01	0.80
Eigenvalue	4.155	2.970	2.190	1.965	1.953	1.896	1.772
Pct. of Total Variance	17.3	12.4	9.1	8.2	8.1	7.9	7.4

NOTE: Results derived from a correlation matrix for 242 MOS, with pairwise deletion for measures with missing values.

eral intellectual ability or "g" factor as a primary factor (Matarazzo, 1972). In considering this interpretation, we note the potential instability of this dimension. As recruitment incentives may change (e.g., lowering the target percentage of high-aptitude recruits), rankings of MOS may also change. Nonetheless, we feel that ability requirements are likely to be a stable dimension for differentiating Army MOS even as the attributes of jobholders in specific MOS may change.

Because the factor contains measures with positive and negative loadings, we show the MOS with the highest and lowest factor scores in Table 3.4. As shown in the table, the MOS ranking highest in ability requirements consist primarily of electronic maintenance specialties; of the ten highest rankings, half are contained within Career Management Field 33, Electronic Warfare/Intercept Systems Maintenance. Another three correspond to CMF 29, Signal Maintenance (MOS 29V, 29Y, 39C), and the sole MOS contained in CMF 35, Electronic Maintenance and Calibration (MOS 35H), is also included. Thus, "high-tech" electronic maintenance specialties, especially those involving communications equipment, are among those requiring the highest levels of ability.

Table 3.3

Measures and Weights Used to Calculate Factor Scores

Measure	Weight for Calculation of Factor Score						
	1	2	3	4	5	6	7
Required ASVAB Score	1						
Average AFQT Score	1						
Target AFQT Score	1						
Pct. of Applicants Above Req. ASVAB	–1						
Educational Requirement	1						
Primary Civ. Occupation Exists		1					
Combat-Related		–1					
Number of CIP Codes		1					
Number of Alt. Civ. Occupations		1					
Ratio of Information to Manip. Tasks			1				
Number of Information Tasks			1				
Data Dominant (vs. Things)			1				
Variable Manpower Training Costs				1			
Variable Op./Maint. Training Costs				1			
Recommended Hours of Associate Credit					1		
Recommended Academic Credit					1		
Recommended Hours of Vocational Credit						1	
Recommended Vocational Credit						1	
Number of ASIs							1
Number of FY89 Accessions							1

Table 3.4

MOS Ranked Highest and Lowest on Ability Requirements

Rank	MOS	Title	Factor Score
		Highest-Ranking MOS	
1	29Y	SATCOM Systems Repairer	2.48
2	35H	Test/Measure/Diagnost. Equip. Maintenance Specialist	2.47
3	33Q	Electronic Warfare (EW)/Intercept (INT) Strategic Proc./Storage Subsy. Repairer	2.05
4	33P	EW/INT Strategic Receiving Sys. Repairer	2.05
5	39C	Target Acquisition/Surveillance Radar Repairer	2.03
6	33T	EW/Intercept Tactical Systems Repairer	2.02
7	71E	Court Reporter	2.00
8	33R	EW/Intercept Aviation Systems Repairer	1.99
9	29V	Strategic Microwave Systems Repairer	1.77
10	33V	EW/Intercept Aerial Sensor Repairer	1.64
		Lowest-Ranking MOS	
233	63W	Wheel Vehicle Repairer	–1.17
234	63J	Quartermaster & Chemical Equipment Repairer	–1.18
235	94B	Food Service Specialist	–1.21
236	81C	Cartographer	–1.22
237	83E	Photo and Layout Specialist	–1.30
238	13B	Cannon Crewmember	–1.30
239	76X	Subsistence Supply Specialist	–1.42
240	83F	Printing and Bindery Specialist	–1.43
241	43M	Fabric Repair Specialist	–1.59
242	57E	Laundry and Bath Specialist	–1.65

The MOS ranking lowest in ability requirements include three MOS in CMF 76, Supply and Services (76X, 43M, 57E), and an additional three MOS in CMF 81, Topographic Engineering (MOS 81C, 83E, 83F). Two specialties in CMF 63, Mechanical Maintenance (MOS 63J, 63W), and one in Field Artillery (MOS 13B) also rank low in ability requirements.

An assumption of our analysis to this point has been that MOS might differ along general dimensions that would imply different approaches for providing training in more cost-effective ways. Unfortunately, it is not immediately apparent how ability requirements of MOS relate to the new training concepts identified by the Army that are the subject of this report (i.e., distributed training, device-based training, and civilian substitution). Common sense suggests that occupations with high ability requirements may lend themselves to such approaches as self-paced instruction and use of artificial intelligence-based training tools. Unfortunately, the research literature provides little guidance in describing how to organize and conduct training uniquely in occupations with high ability requirements. This issue warrants further consideration and research. In the meantime, as will be discussed in the next section, this general dimension seems to be most informative as it helps to qualify conditions under which training concepts may relate to other general dimensions of Army MOS.

Civilian Exchangeability (Factor 2)

The second factor (accounting for 12.4 percent of the combined variance) is defined principally by four measures: (1) primary civilian occupation exists; (2) combat-related MOS (negative loading); (3) number of CIP codes; and (4) number of alternative civilian occupations. Participation of the MOS in the CASTP also contributes to this factor, though less heavily than the previous measures. We term this factor as representing a general dimension of *Civilian Exchangeability*. MOS with high scores are likely to possess one or more associated civilian occupations and/or education programs; they are also less likely to be combat-related.

In comparison with the previous factor, MOS with the highest factor scores on civilian exchangeability are very heterogeneous, representing a variety of career management fields (Table 3.5). These include two Medical occupations (MOS 91F, 92B), two Supply and Services specialties (MOS 76X, 76V), and two in the Visual Information CMF (25P and 25S). In addition, other MOS represent such fields as Food Service (MOS 94B), Petroleum and Water (MOS 77F), Signal Operations (MOS 31N), and Aviation's Operations (MOS 93P). This suggests that there is a wide variety of MOS sharing common features with civilian occupations.

The MOS with the lowest factor scores are primarily combat occupations, but some combat support occupations (mainly involving maintenance of weapons systems) are also included. Given the limited set of measures used to derive this composite (some of which are nominal 0/1 measures), some ties occur throughout the ranking, and a large number of the combat-oriented MOS with no associated civilian occupations or training programs receive identical scores at the bottom of this scale.[17] The 28 MOS that fall in the bottom rank include four

[17]The scoring algorithm differentiates more finely among MOS with related civilian occupations and training courses. Combat-related MOS without civilian occupational or educational counterparts will receive identical scores.

Table 3.5

MOS Ranked Highest and Lowest on Civilian Exchangeability

Rank	MOS	Title	Factor Score
		Highest-Ranking MOS	
1	77F	Petroleum Supply Specialist	1.68
2(T)	25P	Visual Info./Audio Doc. Systems Specialist	1.53
3(T)	25S	Still Documentation Specialist	1.53
4(T)	94B	Food Service Specialist	1.53
5	76X	Subsistence Supply Specialist	1.38
6	93P	Aviations Operations Specialist	1.33
7(T)	31N	Communications Systems/Circuit Controller	1.23
8	76V	Material Storage and Handling Specialist	1.23
9	92B	Medical Laboratory Specialist	1.23
10	91F	Psychiatric Specialist	1.13
		Lowest-Ranking MOS	
215(T)	11B	Infantryman	–1.75
216(T)	11C	Indirect Fire Infantryman	–1.75
217(T)	11H	Heavy Antiarmor Weapons Infantryman	–1.75
218(T)	11M	Fighting Vehicle Infantryman	–1.75
219(T)	13B	Cannon Crewman	–1.75
220(T)	13C	Tacfire Operations Specialist	–1.75
221(T)	13E	Cannon Fire Direction Specialist	–1.75
222(T)	13F	Fire Support Specialist	–1.75
223(T)	13M	Multiple Launch Rocket System (MLRS) Crewmember	–1.75
224(T)	13N	LANCE Crewmember	–1.75
225(T)	13P	MLRS/LANCE Operations/Fire Direction Specialist	–1.75
226(T)	13R	Field Artillery Firefinder Radar Operator	–1.75
227(T)	15E	Pershing Missile Crewmember	–1.75
228(T)	16D	Hawk Missile Crewmember	–1.75
229(T)	16E	Hawk Fire Control Crewmember	–1.75
230(T)	16J	Forward Area Alerting Radar Operator	–1.75
231(T)	16P	Chaparral Crewmember	–1.75
232(T)	16R	Vulcan Crewmember	–1.75
233(T)	16S	MANPADS/STINGER Crewmember	–1.75
234(T)	16T	PATRIOT Missile Crewmember	–1.75
235(T)	19D	Cavalry Scout	–1.75
236(T)	19E	M60 Armor Crewman	–1.75
237(T)	19K	M1 Armor Crewman	–1.75
238(T)	21G	Pershing Electronics Materiel Specialist	–1.75
239(T)	24M	Vulcan System Mechanic	–1.75
240(T)	24N	Chaparral System Mechanic	–1.75
241(T)	24T	PATRIOT Operator and System Mechanic	–1.75
242(T)	25L	AN/TSQ 73 ADA System Operator/Repairer	–1.75

NOTE: (T) indicates a tie in rank.

MOS in CMF 11, Infantry; nine MOS in CMF 13, Field Artillery; eight MOS in CMF 16, Air Defense Artillery; four MOS in CMF 23, Air Defense System Maintenance; and three MOS in Armor CMF 19.

This general dimension of Army MOS appears to correspond closely to the occupational characteristic termed "greenness" in Army publications (TRADOC, 1990), which indicates the degree of overlap between MOS and civilian occupations. Caveats must be kept in mind, however, in interpreting the implications for training redesign. The first is that this dimension gives weight to the *number* of associated civilian occupations and training programs. Those

MOS with multiple counterparts receive higher scores, even though tasks in some may provide only partial overlap. These may appear more civilianlike than an alternative MOS that has a single albeit perfect match.

A second caution is that this dimension does not necessarily imply any single concept for capitalizing on civilian training assets. It does not imply, for example, that use of civilian vocational technical training should be considered for all MOS scoring high on this dimension. Rather it points to a range of civilian training concepts that could be considered for qualifying MOS. Some of the MOS (e.g., those whose tasks overlap partially with civilian occupations) may be most suitable for contract training or lateral entry programs. Others (e.g., those with fewer but more overlapping civilian counterparts) may be best suited for training in civilian institutions.

Dominant Tasks (Factor 3)

Factor 3 (accounting for 9.1 percent of the common variance) is defined primarily by three measures: (1) ratio of informational and cognitive to procedural and manipulative tasks; (2) number of informational tasks; and (3) data versus things dominant. Also contributing to this dimension is the number of manipulative tasks, which loads negatively on this factor. This factor appears easily interpretable as the relative importance of cognitive to manipulative tasks in the occupation; we term this as a general dimension representing the *Dominant Tasks (cognitive versus manipulative),* with higher scores indicating a greater dominance of cognitive tasks and lower values suggesting greater emphasis of procedural tasks.

Note that by definition, this factor is independent of and should not be confused with the ability requirements factor; occupational specialties that involve manipulative skills may require high or low levels of intellectual ability, just as do categories that involve cognitive/informational skills. This factor corresponds closely to two distinct and widely accepted facets of intelligence termed "verbal" and "performance" (Matarazzo, 1972) that are incorporated into many standard intelligence tests.

The MOS with the highest scores (most cognitive) are represented largely among combat service support occupations (Table 3.6). Three of the MOS among the ten with the highest factor scores are in Supply and Services CMF (MOS 76P, 76Y, and 76V). Two MOS each are found in Aviation Operations (MOS 93B and 93C), Medical (MOS 91A, 91X), and Administration CMF (MOS 71D and 75C).

The MOS where manipulative tasks predominate, according to rankings on this factor, include a number of "blue-collar" service and support occupations. General engineering occupations are heavily represented among the ten scoring most extreme in manipulative tasks (MOS 51B, 62E, 62G, 62H, and 62J). Two topographic engineering specialties (MOS 83E and 83F) are also included, as well as one MOS each in Supply and Services (57E), Medical (42D), and Field Artillery CMF (MOS 13B).

This general dimension appears to correspond quite closely to new concepts involving training technologies. Because MOS ranking high on this factor perform a high proportion of cognitive and informational tasks, these may be particularly suitable for approaches that incorporate "distance learning" technologies (i.e., for distributed training). Presumably such

Table 3.6

Highest and Lowest MOS Categories Ranked on Factor 3, Dominant Tasks

Rank	MOS	Title	Factor Score
		Highest-Ranking MOS (Cognitive)	
1	71D	Legal Specialist	2.35
2	76P	Material Control and Accounting Specialist	2.10
3	76Y	Unit Supply Specialist	1.80
4	55R	Ammunition Stock Control and Accounting Specialist	1.79
5	76V	Material Storage and Handling Specialist	1.74
6	91X	Health Physics Specialist	1.71
7	91A	Medical Specialist	1.65
8	75C	Personnel Management Specialist	1.54
9	93B	Aeroscout Specialist	1.49
10	93C	Air Traffic Control Operator	1.47
		Lowest-Ranking MOS (Procedural)	
233	62H	Concrete & Asphalt Equipment Operator	–0.97
234	62E	Heavy Construction Equipment Operator	–0.99
235	51B	Carpentry and Masonry Specialist	–1.00
236	57E	Laundry and Bath Specialist	–1.04
237	42D	Dental Laboratory Specialist	–1.06
238	83E	Photo and Layout Specialist	–1.07
239(T)	13B	Cannon Crewman	–1.16
240(T)	62G	Quarrying Specialist	–1.16
241(T)	62J	General Construction Equipment Operator	–1.16
242(T)	83F	Printing and Bindery Specialist	–1.16

NOTE: (T) indicates a tie in rank.

techniques could be used to deliver some of the training now provided in resident instruction after completion of a shortened AIT. The MOS where manipulative tasks are dominant may lend themselves to expanded use of training aids, devices, simulators, and simulations. These MOS involve repetitive practice, and expanded use of TADSS might improve instructional quality and reduce costs, especially if they substituted for more resource-intensive hands-on training methods.

Costs per Graduate (Factor 4)

Factor 4 (accounting for 8.2 percent of the combined variance) is defined by (1) variable manpower training costs and (2) variable operating and maintenance training costs. We term this general dimension *Costs per Graduate*. The variable costs measures are "per capita"—that is, they reflect the average costs attributable to each graduate in the entry-level training course. The high loading of both measures on this factor indicates that there is a positive association between per-capita operating/maintenance costs and per-capita manpower training costs. "Other variable costs" did not load highly on this factor. This was more closely associated with the civilian exchangeability factor, where its loading suggests that combat-oriented MOS have higher costs associated with procurement of training devices, instructional materials, and contract services. In any event, "other costs" do not represent a substantial portion of variable costs compared to manpower and operating/maintenance costs. The length of training also loads somewhat modestly on this factor.

The MOS with highest per-capita training costs, according to rankings on this unipolar factor, are maintenance and repair occupations, usually involving complex electronic equipment (Table 3.7). Four specialties among the ten MOS with highest per-capita costs are contained within the Land Combat and Air Defense System Intermediate Maintenance CMF (21L, 24H, 27B, 27F). Three are contained within the Electronic Warfare/Intercept Systems Maintenance CMF (33P, 33Q, 33T). Two specialties are contained within the Air Defense System Maintenance CMF (24G, 24T). Finally, an MOS within the Signal Maintenance CMF (29N) ranks 10th on this factor.

This factor suggests that a general dimension of resource intensity would include dollar costs to train a recruit. The implications for training redesign seem straightforward: the MOS with high training costs may be ones on which to focus special attention in implementing new training strategies. As will be discussed later, however, other measures of resource intensity can also bear on selection of MOS in which to seek resource savings through new training concepts and strategies.

Academic Credit (Factor 5)

Factor 5 (accounting for 8.1 percent of the combined variance) is defined as (1) recommended for academic credit and (2) recommended hours of associate credit according to the American Council on Education. Other measures whose loadings help to define this factor include participation in the Civilian Acquired Skills Training Program and the length of AIT training. The former suggests that the MOS selected to participate in this program are likely to have educational programs residing in two-year colleges. The loading for the latter measure indicates that the occupations with longer training periods (usually the more technical and complex occupations) are recognized as having value for civilian education.[18]

This factor seems to be another dimension of civilian exchangeability but one that suggests that certain military skills are transferable to civilian education programs. We term this general dimension *Academic Credit*. As shown in Table 3.8, the occupations that receive the

Table 3.7

MOS Ranked Highest on Cost to Train

Rank	MOS	Title	Factor Score
1	29N	Telephone Central Office Repairer	8.60393
2	24G	Hawk Information Coordination Central Mechanic	4.97999
3	24H	Hawk Fire Control Repairer	3.65636
4	21L	Pershing Electronics Repairer	2.40972
5	33P	EW/Intercept Strategic Receiving Subsystems	2.27479
6	24T	PATRIOT Operator and System Mechanic Repairer	2.20624
7	33Q	EW/Intercept Strategic Processing/Storage Subsystems Repairer	2.18899
8	27F	Vulcan Repairer	2.08808
9	27B	Land Combat Support System Test Specialist	1.98328
10	33T	EW/Intercept Tactical Systems Repairer	1.93682

[18]Length of AIT training thus seems modestly associated with three factors—ability requirements, cost, and academic credit—but is not a primary indicator of any of the dimensions in this analysis.

Table 3.8

MOS Ranked Highest on Academic Credit

Rank	MOS	Title	Factor Score
1	91V	Respiratory Specialist	2.36005
2	21L	Pershing Electronics Repairer	1.63955
3	71E	Court Reporter	1.55949
4	91W	Nuclear Medicine Specialist	1.39938
5(T)	35H	Test, Measurement, and Diagnostic Equipment (TMDE) Maintenance Support Specialist	1.31933
6(T)	71C	Executive Administrative Specialist	1.31933
7(T)	91E	Dental Specialist	1.31933
8(T)	93C	Air Traffic Control Operator	1.31933
9(T)	24G	Hawk Information Coordination Central Mechanic	1.23927
10(T)	42D	Dental Laboratory Specialist	1.23927

NOTE: (T) indicates a tie in rank.

highest scores on this factor include a cross-section of occupations from the medical, supply and services, aviation, and maintenance CMFs. Because ACE recommends "lateral entry" credit in associate degree programs, individuals receiving such education prior to military service might bring useful skills to bear in associated MOS for which they may enlist.

Vocational Credit (Factor 6)

This factor is similar to Factor 5 and is defined as (1) recommended for vocational credit and (2) recommended hours of vocational credit according to the American Council on Education. Thus, we term this factor (accounting for 7.9 percent of the combined variance) *Vocational Credit.* This factor again suggests transferability of military experience for civilian education, in this case to vocational training programs.

Table 3.9 shows the MOS receiving highest scores on this factor. As with the general dimension of academic credit, the occupations are varied and represent CMFs in medical, supply and services, aviation, and maintenance CMFs. In fact, the overlap between the MOS recommended for academic and vocational credit is substantial. These MOS appear highly

Table 3.9

MOS Ranked Highest on Vocational Credit

Rank	MOS	Title	Factor Score
1	91V	Respiratory Specialist	2.81998
2	91C	Practical Nurse	2.46358
3	42C	Orthotic Specialist	2.36852
4	71E	Court Reporter	2.15458
5	91T	Animal Care Specialist	1.86941
6	91W	Nuclear Medicine Specialist	1.67929
7(T)	35H	TMDE Maintenance Support Specialist	1.58423
8(T)	71C	Executive Administrative Specialist	1.58423
9(T)	91E	Dental Specialist	1.58423
10(T)	93C	Air Traffic Controller	1.58423

NOTE: (T) indicates a tie in rank.

exchangeable; in these cases, civilian education and training programs warrant close scrutiny as a possible substitute for military training.

Size and Specialization (Factor 7)

The final factor (accounting for 7.4 percent of the combined variance) is defined by (1) number of ASIs and (2) number of personnel trained. This factor appears to combine the concepts of MOS size—the number of personnel trained in the occupation—and occupational breadth—the number of subsequent specializations within the MOS. This factor suggests that MOS that train larger numbers of personnel also tend to "gate" subgroups of trainees into subsequent, more specialized training courses (represented by the number of ASI codes).[19] Indeed, the MOS with the largest number of entrants (MOS 11B, Infantryman) also has the largest number of associated ASI.

We interpret this factor as representing an additional general dimension of training resource intensity. The MOS with the highest number of personnel and numerous "subspecialties" may be ones where cost-reducing training strategies might be effectively employed. As shown in Table 3.10, the MOS represented here include many of the large and important combat arms, combat support arms, and combat service support occupations in the Army.

SUMMARY AND DISCUSSION

In this section, we analyzed a number of measures of Army entry-level enlisted MOS that we considered potentially related to new Army training concepts and strategies, including measures of jobholder attributes, task requirements, civilian similarity, and training resource intensity. We conducted statistical analyses to determine if the measures could be summarized by a smaller number of general training-relevant dimensions. The analysis revealed seven main factors: (1) Ability Requirements; (2) Civilian Exchangeability; (3) Dominant Tasks; (4) Costs per Graduate; (5) Academic Credit; (6) Vocational Credit; and (7) Size and Spe-

Table 3.10

MOS Ranked Highest on Size and Specialization

Rank	MOS	Title	Factor Score
1	11B	Infantryman	8.46195
2	95B	Military Police	3.75963
3	19D	Cavalry Scout	2.97851
4	91A	Medical Specialist	2.82166
5	13B	Cannon Crewman	2.05040
6	11M	Fighting Vehicle Infantryman	2.01883
7	31C	Single-Channel Radio Operator	2.00934
8	88M	Motor Transport Operator	1.73346
9	76Y	Unit Supply Specialist	1.70264
10	31L	Wire Systems Installer	1.58836

[19]In recent years the Army has been reluctant to increase the number of separate MOS; in part, this has been offset by an increase in the number of ASIs approved for existing MOS. This factor may illustrate this phenomenon.

cialization. We believe that these general dimensions reflect meaningful distinctions among MOS, though some appear to be related. For example, similarity between Army MOS and civilian occupations seems to be addressed by three of our general dimensions (2, 5, and 6). In addition, training resource intensity appears in two of the dimensions (4 and 7).

We then calculated composite factor scores for each of the seven factors and rank-ordered the MOS relative to each of these. We interpreted these factors with illustrative MOS and considered how they may relate to new Army training concepts. Some of the general dimensions seem to relate more clearly to new Army training concepts than others. For example, Dominant Tasks and Civilian Exchangeability seem clearly related to Army plans for distributed training and use of training technologies, and various concepts for capitalizing on civilian training assets. The training resource dimensions seem less useful for suggesting specific changes in training organization and delivery. They are potentially useful, however, for setting priorities among MOS for new training concepts, as we discuss in the next section.

4. SETTING PRIORITIES AMONG MOS FOR NEW TRAINING CONCEPTS

This section illustrates how our analysis of training-related characteristics of Army MOS may be used to identify specific MOS in which significant cost savings might be achieved by implementing new Army training concepts. We present an analytic framework that defines criteria for identifying MOS suitable for each training concept and where significant cost savings might be achieved by implementing distributed training, expanding use of training technologies, and/or capitalizing on civilian training assets.

OVERVIEW

Our framework emphasizes the suitability of a training concept to an MOS and the current costs to the Army of conducting the entry-level training course. Consistent with our discussion in Section 2, changes in training strategy should be considered first in those programs of individual military education and training with the most substantial training resources. As we have argued, overall cost reductions may be best achieved for specialized skill training of officers and enlisted personnel, and initial skill training of enlisted personnel in particular.

Once the more costly training programs are identified, MOS may be considered as suitable for specific training concepts and strategies such as distributed training, use of training technologies, and substitution of civilian education or job experience. Based on the analysis in the previous section, we link MOS to training concepts and strategies identified by the Army (TRADOC, 1990) as follows:

- *Distributed training strategy* for MOS where cognitive tasks are dominant. In addition, a distributed training strategy may be especially suitable for MOS with a large proportion of cognitive tasks and high ability requirements or low civilian exchangeability.
- *Device-based training strategy* emphasizing training aids, devices, simulators, and simulations for MOS where procedural tasks are dominant. In addition, a device-based strategy may be especially suitable for MOS with low civilian exchangeability.
- *Substitution of civilian training or job experience* for MOS with high civilian exchangeability. Such approaches may also be especially useful in MOS with low ability requirements.

Our analytic framework, summarized in Table 4.1, lists the proposed Army training concepts that we consider as rows of the table, with the general training-related dimensions of Army enlisted entry-level MOS as the columns. The table indicates criteria that may be used to determine where the training concept may prove to be of greatest value. Further refinements and distinctions are possible, and additional training concepts can be considered, as will be discussed later in this section.

Table 4.1

Framework for Selection of Training Strategies

	Ability Requirements	Dominant Tasks	Civilian Exchangeability	Cost to Train
Distributed Training	N/A or High	Cognitive	N/A or Low	High
Use of TADSS	N/A	Procedural	N/A or Low	High
Civilian Training or Job Experience	N/A or Low	N/A	High	High

COST CONSIDERATIONS

The initial criterion for considering the applicability of new training strategies is the cost to train recruits in the MOS. As shown in the previous section, per-capita cost is a general training-related dimension, but alternative methods of estimating training cost other than use of factor scores may be more suitable for analytic purposes. Although the analysis indicates that personnel (MPA) and operations/maintenance (OMA) costs are principal measures of per-capita cost, other variable costs (e.g., those associated with supplies, materials, and training devices) contribute to per-capita costs in the Army's cost accounting systems. Thus, for purposes of comparing MOS on per-capita costs, these costs should be included in an index of total per-capita training cost. We create a new index by adding variable MPA costs, variable OMA training costs, and other variable training costs.[1] Finally, to provide a consistent measure of training costs across MOS, we add $6000, the TRADOC DCS-RM's (Deputy Chief of Staff for Resource Management) estimate of the total variable cost of basic training, to the total variable cost of AIT courses.[2]

The MOS found to be highest in total per-capita cost according to this measure are shown in Table 4.2, along with the estimated number of course graduates in FY89.[3] These MOS are generally concerned with the repair of electronic weapons systems, and they are consistent with the rankings provided by using factor scores. The figures presented in Table 4.2 indicate, however, a limitation associated with this measure. MOS that are costly on a per-capita basis generally train small numbers of soldiers. Although the cost per soldier may be high, because of the small number of trainees, the potential savings may be limited with respect to the Army's overall costs for providing enlisted initial skill training.

For this reason, we prefer a measure of training cost that considers both of the resource-related dimensions of MOS identified in our analysis—MOS size in addition to the per-capita training cost. To make this measure as precise as possible, we derive an estimate of total training cost by multiplying the total per-capita training cost and the number of graduates in

[1]To make this measure consistent with others in the database, we estimated this measure for FY89 by deflating the MPA and OMA measures by using the Department of Defense's adjustment factors of 0.9819 and 0.9493, respectively.

[2]This provides a common cost basis for comparing graduates of OSUT and AIT courses.

[3]Appendix B contains complete rankings of MOS on both total per-capita cost (Table B.1) and number of graduates in FY89 (Table B.2).

Table 4.2

MOS with Highest Per-Capita Training Costs

Rank	MOS	Title	Total Cost per Capita	Number of Graduates (FY89)
1	29N	Telephone Central Office Rep.	$149,424	113
2	24G	Hawk Info. Coord. Mechanic	$91,150	34
3	24H	Hawk Fire Control Repairer	$71,306	19
4	24T	PATRIOT Operator & Sys. Mech.	$55,890	215
5	21L	Pershing Electronics	$54,629	77
6	33P	EW/Intercept Rec. Sys. Repair	$53,636	110
7	33Q	EW/Intercept Proc./Storage Rep.	$52,737	92
8	27F	Vulcan Repairer	$49,744	79
9	33T	EW/Intercept Tactical Sys. Rep.	$48,731	131
10	27B	Land Combat Support Sys. Test	$48,466	58

NOTE: Based on 242 MOS.

Table 4.3

MOS with Highest and Lowest Total Training Cost

Rank	MOS	Title	Cost per Capita	Number of graduates (FY89)	Estimate of Total Cost ($ in thousands)
		Highest-Ranking MOS			
1	11B	Infantryman	$8,767	11326	$99,286
2	88M	Motor Transport Operator	$26,043	3764	$98,030
3	95B	Military Police	$20,043	4161	$83,404
4	91A	Medical Specialist	$13,502	3962	$53,501
5	13B	Cannon Crewman	$10,657	3966	$42,267
6	98G	EW/SIGINT Voice Interc.	$31,367	1131	$35,489
7	63B	Light Wheel Vehicle	$13,207	2534	$33,463
8	94B	Food Service Specialist	$13,410	2370	$31,781
9	31C	Single-Channel Radio Op.	$18,547	1581	$29,321
10	12B	Combat Engineer	$8,575	2979	$25,542
		Lowest-Ranking MOS			
229	51K	Plumber	$8,535	38	$324
230	91V	Respiratory Specialist	$17,515	18	$314
231	27L	LANCE System Repairer	$17,391	17	$302
232	92E	Cytology Specialist	$26,043	11	$287
233	91U	Ear Nose & Throat Spec.	$10,241	28	$284
234	51G	Materials Quality Spec.	$19,386	13	$261
235	91X	Health Physics Spec.	$26,043	9	$235
236	91N	Cardiac Specialist	$8,726	21	$182
237	42C	Orthotic Specialist	$27,132	7	$180
238	62G	Quarrying Specialist	$8,944	11	$99

NOTE: Based on 242 MOS, with cost per capita and number of graduates rounded to the nearest integer; total cost estimate may not equal product of per-capita cost and number of graduates due to rounding.

each MOS in FY89.[4] Table 4.3 shows the ten MOS that rank highest and lowest according to this measure of total training cost; a complete ranking is shown in Appendix Table B.3.

The five highest MOS are 11B Infantryman, 88M Motor Transport Operator, 95B Military Police, 91A Medical Specialist, and 13B Cannon Crewmember. These MOS are also the five with the largest numbers of 1989 graduates. A strong association between total training cost and number of graduates is evident throughout the table—again, among the ten MOS that rank lowest on Total Training Cost, eight rank among the lowest ten in terms of number of 1989 graduates. Although MOS vary in per-capita training costs, the variation is moderate compared with differences in the number of personnel trained. Thus, differences in total training cost appear determined primarily by differences in throughput. This suggests that, all other things being equal, attempts to decrease training costs should focus on large MOS, though opportunities for achieving training cost savings may also exist in the smaller, more technically oriented MOS.

SPECIFIC MOS SUITABLE FOR NEW TRAINING CONCEPTS

We now turn our attention to the MOS that are highest in total training cost, which we define as above the median value ($2,877,000) for the 242 entry-level enlisted MOS under consideration. In the remainder of this section, we consider the MOS that may be most suitable for new training concepts under consideration by the Army, using the rankings of MOS on general training-related dimensions. Generally, our strategy consists of (1) linking the general dimensions revealed in the factor analysis to training concepts, as illustrated in Table 4.1; (2) classifying MOS across the general dimensions that relate to specific training concepts; and (3) using rankings of MOS within classifications to suggest suitable and potentially cost-effective applications of training concepts.

For each general dimension considered, we define the MOS whose factor scores were in the top third of the distribution of scores as "high" on that dimension and those in the bottom third as being "low." We then classify and rank the MOS by combining factors as described below.[5]

Candidate MOS for Distributed Training

As described in Army doctrinal publications, distributed training envisions a reduction in the length of resident courses, accompanied by the use of "distance learning technologies" to train individual skills in field units "at the time and place when needed" (TRADOC, 1990). Because distributed training emphasizes the use of media such as print, videodisc, computers, interactive videodisc, and televideo, proponents argue that this strategy is especially suitable for training cognitive skills and tasks. Accordingly, the higher-cost MOS found in

[4]We calculate the number of graduates by subtracting the number of "no-shows"—that is, those recruits who did not begin training—from the number of accessions and adjust this number using the training attrition rate for each MOS in FY89 to estimate the number of course graduates. Numbers presented in the tables are rounded to the nearest integer.

[5]In principle this approach can be used to combine any general dimensions of interest; e.g., to use per-capita cost as the principal cost criterion or to raise or lower the threshold within general dimensions.

Table 4.4

High-Cost MOS Dominant in Cognitive Skills

Rank	MOS	Title	Estimate of Total Cost
1	95B	Military Police	$83,404,000
2	91A	Medical Specialist	$53,501,000
3	98G	EW/SIGINT Voice Interceptor	$35,489,000
4	13F	Fire Support Specialist	$23,562,000
5	54B	Chemical Operations	$23,013,000
6	76Y	Unit Supply Specialist	$19,681,000
7	98C	EW/SIGINT Analyst	$19,521,000
8	76C	Equipment Records & Parts Spec.	$18,473,000
9	31M	Multichannel Commo. Specialist	$18,401,000
10	19D	Cavalry Scout	$18,314,000
11	77F	Petroleum Supply Specialist	$18,275,000
12	72E	Tactical Telecommun. Cntr. Oper.	$13,375,000
13	71L	Administrative Specialist	$13,331,000
14	93C	Air Traffic Control Operator	$12,530,000
15	76V	Material Storage/Handling Spec.	$12,286,000
16	75B	Personnel Admin. Specialist	$12,220,000
17	02X	Bandsman	$9,297,000
18	91C	Practical Nurse	$9,144,000
19	93B	Aeroscout Specialist	$8,160,000
20	13E	Cannon Fire Direction Spec.	$7,608,000
21	31Q	Tactical Satellite/Microwave Op.	$7,423,000
22	76P	Material Control/Account. Spec.	$7,350,000
23	92B	Medical Laboratory Spec.	$7,063,000
24	71M	Chaplain Assistant	$6,764,000
25	82C	FA Surveyor	$6,326,000
26	96B	Intelligence Analyst	$6,168,000
27	93P	Aviations Operations	$5,950,000
28	98J	EW/SIGINT Noncomm. Interceptor	$5,723,000
29	97E	Interrogator	$5,683,000
30	71D	Legal Specialist	$5,160,000
31	97B	Counterintelligence Agent	$4,945,000
32	31N	Commo. Systems/Circuit Contr.	$4,834,000
33	81Q	Terrain Analyst	$4,653,000
34	74F	Programmer/Analyst	$4,300,000
35	73C	Finance Specialist	$3,275,000
36	35G	Biomedical Equipment Repairer	$3,024,000
37	74D	Computer/Machine Op.	$2,882,000

our analysis that emphasize cognitive and informational skills might be especially attractive candidates for distributed training, just as the segments of these courses devoted to such skills might be appropriate for training using distributed media. Thus, in general, MOS like those shown in Table 4.4, which lists the MOS above the median in total cost and ratio of cognitive to procedural tasks, could be considered for this form of training.[6]

More exclusive criteria for selecting MOS for distributed training might also be considered. For example, one could argue that high ability requirements are an additional criterion for considering distributed training, since cognitive skills that require higher ability might

[6]We also examined rankings of MOS using per-capita cost as a criterion. Many of the MOS are the same, but many of the remainder fall well below the median in total cost, indicating limited potential to save costs of magnitude.

be more subject to skill decay and the need for refresher training or because higher-ability individuals might be more motivated or capable of engaging in self-directed or self-paced learning while on the job. Additionally, one might hypothesize that regardless of ability requirements, distributed training might be appropriate for cognitively demanding and military-specific (i.e., nonexchangeable) occupations, since training support materials or alternative delivery systems (e.g., through civilian education programs or job experience) may be less available for these jobs.[7]

According to these criteria, our results suggest that 11 MOS among those analyzed are high in total cost to train, high in the ratio of cognitive to procedural skills, and high in ability requirements. An additional five MOS emerge as high in cost, high in the ratio of cognitive to procedural skills, and low in civilian exchangeability. These MOS are shown in Table 4.5. Thus the MOS listed in Tables 4.4 and 4.5 may represent good candidates in general for incorporating principles of distributed training among Army entry-level enlisted MOS.

Candidate MOS for Use of TADSS

We next consider the MOS that may be most appropriate for use of training aids, devices, simulators, and simulations. Although use of TADSS is implicit in conceptions of distributed training, here we emphasize the role that TADSS may play in the training of procedural skills, which frequently relies on repetitive drill and practice for skill mastery. In addition, we may wish to consider use of TADSS in schoolhouse environments, where TADSS may be

Table 4.5

High-Cost MOS Dominant in Cognitive Skills and High in Ability Requirements or Low in Civilian Exchangeability

Rank	MOS	Title	Estimate of Total Cost
		High in Ability Requirements	
1	98G	EW/SIGINT Voice Interceptor	$35,489,000
2	98C	EW/SIGINT Analyst	$19,521,000
3	02X	Bandsman	$9,297,000
4	93B	Aeroscout Specialist	$8,160,000
5	96B	Intelligence Analyst	$6,168,000
6	98J	EW/SIGINT Noncomm. Interceptor	$5,723,000
7	97E	Interrogator	$5,683,000
8	71D	Legal Specialist	$5,160,000
9	97B	Counterintelligence Agent	$4,945,000
10	31N	Commo. Systems/Circuit Controller	$4,835,000
11	35G	Biomedical Equipment Repairer	$3,024,000
		Low in Civilian Exchangeability	
12	13F	Fire Support Specialist	$23,562,000
13	19D	Cavalry Scout	$18,314,000
14	93B	Aeroscout Specialist	$8,160,000
15	13E	Cannon Fire Direction Spec.	$7,608,000
16	97B	Counterintelligence Agent	$4,945,000

[7]On the other hand, distributed training products that are easily adaptable by the Army may already exist for civilian occupations that are similar to Army occupations.

used to increase the efficiency of training separately from its potential value for training in field units.[8]

The 47 Army entry-level enlisted MOS that rank as highest in cost and emphasis of procedural skills are shown in Table 4.6. A variety of combat, support, and service occupations appear to hold high cost to train while emphasizing procedural or manipulative skills. Some of these (e.g., Food Service Specialist or Wire Systems Installer) may benefit less from use of TADSS, however, since the equipment and materials used in these MOS may be readily available, reducing the value of TADSS to provide a training opportunity.[9]

Thus, we note that training strategies that emphasize use of TADSS might be further restricted to MOS where TADSS are used to conserve resources, e.g., to substitute for more expensive equipment, save wear and tear on existing equipment, or allow for a reduction in the use of other training resources (e.g., fuel or ammunition). Such opportunities are most likely to be found within military-specific (nonexchangeable) occupations, because these are more likely to involve the use of expensive weapons systems. Imposing such a restriction eliminates several MOS in Table 4.6 and yields 17 MOS, which are shown in Table 4.7. Indeed, the list includes several high-density combat MOS in which training is equipment-intensive. Development or further use of TADSS in each of these MOS might provide considerable savings in training resources such as fuel, ammunition, or operations and maintenance costs.

Candidate MOS for Civilian Training or Job Experience

Substitution of civilian-provided training, for example, through use of civilian vocational technical schools or contract training services, is a training concept under consideration by the Army. Use of civilian resources is expected to provide trainees with a ready base of knowledge, allowing for reduction or elimination of training courses now conducted in military facilities. By similar logic, expanded use of programs that give credit for employment experiences (such as the Army's Civilian Acquired Skills Training Program) could also provide the Army with individuals who are more ready to assume military jobs.

An obvious hypothesis is that the Army MOS with greatest "civilian exchangeability" and highest cost to train, according to our analyses, could be most suitable for some form of civilian substitution, assuming that the costs of such programs are favorable compared to current or alternative training approaches. The 46 MOS that rank above the median in cost and civilian exchangeability are shown in Table 4.8.[10]

As in our discussion of distributed training, we might again specify additional restrictive criteria for identifying MOS that may be suitable for civilian training or credit for job experience. For example, one could argue that such programs would be more suitable for Army occupations with lower ability requirements, because individuals with competency in the skills

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[8]Given the cost of the more sophisticated simulators and simulations, economies of scale may also be achieved through use in centralized training facilities.

[9]Less technology-intensive TADSS (e.g., panel trainers) or distributed media might be useful in these MOS for subsequent reinforcement training, however).

[10]One might also wish to consider for this strategy the MOS for which substantial academic or vocational credit is recommended by the American Council on Education, as listed in Appendix Tables A.4 and A.5. MOS with high scores on these factors may be especially suitable for training in civilian institutions.

Table 4.6

High-Cost MOS Dominant in Procedural Skills

Rank	MOS	Title	Estimate of Total Cost
1	11B	Infantryman	$99,286,000
2	13B	Cannon Crewman	$42,267,000
3	94B	Food Service Specialist	$31,781,000
4	63W	Wheel Vehicle Repairer	$21,860,000
5	11M	Fighting Vehicle Infantryman	$21,373,000
6	31K	Combat Signaler	$20,798,000
7	19K	M1 Armor Crewman	$20,748,000
8	67T	Tactical Transport Helicop. Rep.	$15,767,000
9	63H	Track Vehicle Repairer	$13,983,000
10	63T	Bradley Fighting Veh. Sys. Rep.	$13,213,000
11	16S	MANPADS/STINGER Crewman	$12,850,000
12	29E	Radio Repairer	$12,827,000
13	11C	Indirect Fire Infantryman	$11,728,000
14	31L	Wire Systems Installer	$11,334,000
15	67N	Utility Helicopter Repairman	$11,191,000
16	16T	PATRIOT Missile Crewman	$10,440,000
17	67Y	AH-1 Attack Helicopter Rep.	$9,950,000
18	67R	AH-64 Attack Helicopter Rep.	$8,737,000
19	11H	Heavy Antiarmor Weapons Infant.	$8,693,000
20	67U	Medium Helicopter Repairer	$7,915,000
21	13M	Multiple Launch Rocket Sys. Crew.	$7,794,000
22	68J	Aircraft Armament/Missile Rep.	$7,062,000
23	33T	EW/Intercept Tactical Sys. Rep.	$6,402,000
24	67V	Observation/Scout Hel. Rep.	$6,025,000
25	33P	EW/Intercept Rec. Sys. Repair	$5,911,000
26	63J	Quartermaster/Chem. Equip. Rep.	$5,689,000
27	15E	Pershing Missile Crewman	$5,676,000
28	44B	Metal Worker	$5,423,000
29	19E	M60 Armor Crewman	$5,070,000
30	43E	Parachute Rigger	$4,935,000
31	33Q	EW/Intercept Proc./Storage Rep.	$4,860,000
32	13N	LANCE Crewmember	$4,618,000
33	62E	Heavy Construction Equip. Op.	$4,266,000
34	12F	Engineer Tracked Veh. Crewman	$4,191,000
35	68G	Aircraft Structural Repairer	$4,019,000
36	51B	Carpentry & Masonry Spec.	$3,760,000
37	16D	Hawk Missile Crewman	$3,711,000
38	68D	Aircraft Powertrain Repairer	$3,565,000
39	68N	Avionic Mechanic	$3,433,000
40	62J	General Construction Eq. Op.	$3,306,000
41	68F	Aircraft Electrician	$3,301,000
42	96R	Ground Surveillance Sys. Op.	$3,269,000
43	24M	Vulcan System Mechanic	$3,210,000
44	33R	EW/INT Aviation Sys. Repair	$3,168,000
45	24G	Hawk Information Coord. Mech.	$3,119,000
46	12C	Bridge Crewman	$3,109,000
47	62B	Construction Equipment Repairer	$2,972,000

Table 4.7

High-Cost MOS Dominant in Procedural Skills and Low in Civilian Exchangeability

Rank	MOS	Title	Estimate of Total Cost
1	11B	Infantryman	$99,286,000
2	13B	Cannon Crewman	$42,267,000
3	11M	Fighting Vehicle Infantryman	$21,373,000
4	19K	M1 Armor Crewman	$20,748,000
5	16S	Manpads/Stinger Crewman	$12,850,000
6	11C	Indirect Fire Infantryman	$11,728,000
7	16T	PATRIOT Missile Crewman	$10,440,000
8	11H	Heavy Antiarmor Weapons Infant.	$8,693,000
9	13M	Multiple Launch Rocket Sys. Crew.	$7,794,000
10	15E	Pershing Missile Crewman	$5,676,000
11	19E	M60 Armor Crewman	$5,070,000
12	13N	LANCE Crewmember	$4,618,000
13	16D	Hawk Missile Crewmember	$3,711,000
14	96R	Ground Surveillance Sys. Operator	$3,269,000
15	24M	Vulcan System Mechanic	$3,210,000
16	24G	Hawk Info. Coord. Mechanic	$3,119,000
17	12C	Bridge Crewman	$3,109,000

needed in these occupations (demonstrated by successful completion of training or on-the-job experience) might be better able to meet the less demanding performance standards held in these occupations.[11]

Application of these more restrictive criteria yields 22 MOS that are high in cost, high in civilian exchangeability, and low in ability requirements (Table 4.9). Thus, should civilian exchangeability be especially suitable for the low-ability MOS, these MOS might be considered as candidates for using civilian training or job experience. If ability requirements are not as relevant, then the MOS listed in Table 4.6 could be especially good candidates for substitution of civilian training or job experience.[12]

SUMMARY

In this section, we illustrated how the general training-related dimensions emerging from our analyses can be used to identify MOS that may be suitable candidates for selected new

[11]One might also wish to consider whether this training concept may be more or less suitable for MOS that emphasize cognitive versus procedural skills. Though one could argue the merits for favoring one set of skills, when we examined costly, exchangeable MOS by this criteria, we observed suitable and less suitable cases in both categories. Examples include MOS 74F, Programmer/Analyst, and MOS 29E, Radio Repairer, which emphasize cognitive and procedural tasks, respectively, while appearing to have potential transferability from civilian to military settings. Thus we have concluded that candidate MOS may not necessarily be differentiated by dominant tasks of the MOS.

[12]Interestingly, among the 22 MOS listed in Table 4.7, only 12 are presently included in the Army's Civilian Acquired Skills Training Program (MOS 88M, 94B, 63H, 72E, 88H, 31L, 52C, 44B, 62E, 51B, 62J, and 62B). The Army might consider reviewing the criteria for deciding the MOS that participate in the CASTP in light of these analyses. In addition, for each exchangeable MOS, the Army might consider the conditions under which civilian employment experience might substitute for civilian training while still providing transferable skills.

Table 4.8

High-Cost MOS High in Civilian Exchangeability

Rank	MOS	Title	Estimate of Total Cost
1	88M	Motor Transport Operator	$98,030,000
2	95B	Military Police	$83,404,000
3	91A	Medical Specialist	$53,501,000
4	98G	EW/SIGINT Voice Interceptor	$35,489,000
5	94B	Food Service Specialist	$31,781,000
6	12B	Combat Engineer	$25,542,000
7	63W	Wheel Vehicle Repairer	$21,860,000
8	98C	EW/SIGINT Analyst	$19,521,000
9	77F	Petroleum Supply Specialist	$18,275,000
10	52D	Power-Generation Equip. Rep.	$16,866,000
11	29N	Telephone Central Office Rep.	$16,828,000
12	63H	Track Vehicle Repairer	$13,983,000
13	72E	Tactical Telecomm. Center Op.	$13,375,000
14	71L	Administrative Specialist	$13,331,000
15	29E	Radio Repairer	$12,827,000
16	88H	Cargo Specialist	$12,815,000
17	76V	Material Storage/Handling Spec.	$12,286,000
18	75B	Personnel Administration Spec.	$12,220,000
19	31L	Wire Systems Installer	$11,334,000
20	72G	Auto. Data Telecom. Ctr. Op.	$10,312,000
21	76P	Material Control/Account. Spec.	$7,350,000
22	92B	Medical Laboratory Specialist	$7,063,000
23	33T	EW/Intercept Tactical Sys. Rep.	$6,402,000
24	96B	Intelligence Analyst	$6,168,000
25	29M	Tactical Sat./Microwave Rep.	$6,153,000
26	52C	Utilities Equipment Repairer	$6,090,000
27	93P	Aviation Operations Specialist	$5,950,000
28	33P	EW/Intercept Rec. Sys. Repair	$5,911,000
29	98J	EW/SIGINT Noncomm. Interceptor	$5,723,000
30	63J	Quartermaster/Chem. Equip. Rep.	$5,689,000
31	44B	Metal Worker	$5,423,000
32	31N	Commo. Systems/Circuit Controller	$4,834,000
33	29J	Telecomm. Terminal Device Repair	$4,426,000
34	74F	Programmer/Analyst	$4,300,000
35	36L	Transp. Auto. Swtch. Op./Maint.	$4,277,000
36	62E	Heavy Construction Equip. Op.	$4,266,000
37	68G	Aircraft Structural Repairer	$4,019,000
38	51B	Carpentry & Masonry Spec.	$3,760,000
39	68N	Avionic Mechanic	$3,433,000
40	29Y	SATCOM Systems Repairer	$3,324,000
41	62J	General Construction Eq. Op.	$3,306,000
42	29S	Field Commo. Security	$3,207,000
43	33R	EW/INT Aviation Sys. Repairer	$3,168,000
44	35G	Biomedical Equip. Repairer	$3,024,000
45	62B	Construction Equipment Repairer	$2,972,000
46	74D	Computer/Machine Operator	$2,882,000

training concepts under consideration by the Army. The strategies include distributed training; expanded use of training aids, devices, simulators, and simulations; and greater reliance on civilian training or employment as substitutes for military training. We classify MOS using their scores on various dimensions to identify the high-cost MOS that possess other characteristics that may make them suitable for each of these concepts.

Table 4.10 summarizes the MOS that may be especially suitable candidates for further assessment within the training concepts discussed. They include the five most costly MOS as follows: cognitive tasks dominant (distributed training); procedural tasks dominant and low in civilian exchangeability (use of TADSS); and, highest in civilian exchangeability (civilian training or job experience).

These MOS include a cross-section of occupations from the combat arms, combat support arms, and combat service support specialties. They process large numbers of trainees, with significant costs to train. Moreover, as can be seen in the table, some of the MOS may lend themselves to more than one strategy. As the Army proceeds with plans to develop new training strategies based on concepts described in this report, a selection of MOS from Table 4.10 might provide a useful starting point for implementing and testing new strategies that may save on costs while assessing the costs, feasibility, and implications of changes in training strategies in these MOS.

Table 4.9

High-Cost MOS High in Civilian Exchangeability and Low in Ability Requirements

Rank	MOS	Title	Estimate of Total Cost
1	88M	Motor Transport Operator	$98,030,000
2	91A	Medical Specialist	$53,501,000
3	94B	Food Service Specialist	$31,781,000
4	12B	Combat Engineer	$25,542,000
5	63W	Wheel Vehicle Repairer	$21,860,000
6	77F	Petroleum Supply Specialist	$18,275,000
7	52D	Power-Generation Equipment Rep.	$16,866,000
8	63H	Track Vehicle Repairer	$13,983,000
9	72E	Tactical Telecom. Center Oper.	$13,375,000
10	88H	Cargo Specialist	$12,815,000
11	76V	Material Storage/Handling Spec.	$12,286,000
12	75B	Personnel Admin. Specialist	$12,220,000
13	31L	Wire Systems Installer	$11,334,000
14	72G	Automatic Data Telecom. Cntr. Op.	$10,313,000
15	76P	Material Control/Account. Spec.	$7,350,000
16	52C	Utilities Equipment Repairer	$6,090,000
17	63J	Quartermaster/Chem. Equip. Rep.	$5,689,000
18	44B	Metal Worker	$5,423,000
19	62E	Heavy Construction Equip. Op.	$4,266,000
20	51B	Carpentry & Masonry Spec.	$3,760,000
21	62J	General Construction Eq. Op.	$3,306,000
22	62B	Construction Equipment Repairer	$2,972,000

Table 4.10

Costly MOS and Potential Training Strategies

MOS	Title	Distributed Training	Use of TADSS	Civilian Substitution	Estimate of Total Cost
11B	Infantryman		X		$99,286,000
88M	Motor Transport Operator			X	$98,029,800
95B	Military Police	X	X	X	$83,403,600
91A	Medical Specialist	X		X	$53,500,700
13B	Cannon Crewman		X		$42,266,900
98G	EW/Signal Intelligence	X		X	$35,488,500
94B	Food Service Specialist			X	$31,781,200
13F	Fire Support Specialist	X			$23,561,500
54B	Chemical Operations	X			$23,013,400
11M	Fighting Veh. Infantryman		X		$21,373,300
19K	M1 Armor Crewman		X		$20,747,800
16S	MANPADS/STINGER Crewman		X		$12,850,400

5. CONCLUSIONS

This report has presented the results of research analyzing training-related characteristics of Army entry-level enlisted occupations. Our goal has been to explore relationships between new Army concepts for conducting individual training and the training programs in which these are to be implemented. To accomplish this, we analyze Army MOS to determine general training-related dimensions, and we link these dimensions and specific MOS to training concepts and strategies under consideration by the Army. These include TRADOC's distributed training strategy, device-based training strategy, and concepts for capitalizing on civilian training assets.

As described in this report, our results indicate enlisted entry-level MOS can be distinguished along a set of general training-related dimensions, which include ability requirements, civilian exchangeability, dominant tasks, and cost to train. These dimensions can be related to the training concepts that are the subject of this report. The general dimensions that measure civilian exchangeability, for example, relate to concepts for expanding civilian-based training or Army lateral entry programs. The general dimension that characterizes the dominant task of an MOS relates to strategies for expanding the use of training technologies (i.e., through distributed and device-based training). At this time, the remaining general dimensions seem most useful in identifying specific MOS where these training concepts and strategies may prove most suitable and cost-effective.

Although we define certain MOS as candidates for particular strategies, because our analysis captures important training-related characteristics of Army enlisted MOS, they may be helpful in organizing MOS in ways that cut across existing occupational classifications. Thus, the empirical results and analytic framework described herein may prove useful for linking MOS for other approaches that envision broad changes in how Army individual training programs are organized and delivered.

Based on our analyses, we conclude that fruitful opportunities for reducing the cost of training may exist within the MOS designed as appropriate for each training concept. However, further analysis is needed before implementing changes on a widespread basis. Specifically, analysis needs to determine the extent of the cost savings that may be achieved in practice and other implications of changes in training organization and delivery. A principal consideration, for example, would include changes in soldier proficiency that may accompany changes in training strategy. Ideally, such fundamental changes in current training approaches should maintain existing levels of proficiency while reducing costs. However, if decreases in proficiency or other negative consequences are likely, policymakers need the tradeoffs between cost savings and proficiency to be carefully specified.

Based on these analyses, we recommend that the Army proceed with a series of demonstrations and evaluations, in a small number of MOS, to examine the costs, feasibility, and possible implications of implementing new training approaches along the lines identified in this report. Ideally, such analyses should proceed through detailed case studies of new training approaches within specific MOS, from which results may generalize to related MOS. The analyses in this report suggest groups of occupations that seem appropriate for each strategy; each contains several promising candidates. Further research should closely examine a

number of these MOS, considering the new training concepts currently identified by the Army, as well as others that may be suggested through careful analysis of job requirements and current training approaches within the MOS.

Appendix A
FACTOR RANKINGS OF MOS

Table A.1

MOS Ranked on Factor 1, Ability Requirements

Rank	MOS	Title	Score
1	29Y	SATCOM Systems Repair	2.48153
2	35H	TMDE Maintenance Sup	2.47204
3	33Q	EW/Intercept Strateg	2.04871
4	33P	EW/Intercept Strateg	2.04823
5	39C	Target Acquisition	2.03113
6	33T	EW/Intercept Tactical	2.01831
7	71E	Court Reporter	2.00309
8	33R	EW/Intercept Aviation	1.99088
9	29V	Strategic Microwave	1.76708
10	33V	EW/Intercept Aerial	1.63508
11	29E	Radio Repairer	1.63164
12	36L	Transportable Automa	1.62463
13	39D	Decentralized Svc	1.61519
14	71D	Legal Specialist	1.49530
15	98C	EW/Signal Intelligen	1.29572
16	29F	Fixed Communications	1.29436
17	96F	Psychological Operat	1.29434
18	39Y	FA Tactical Fire Dir	1.28565
19	46R	Broadcast Journalist	1.24748
20	39L	FA Digital Systems	1.23971
21	46Q	Journalist	1.15393
22	39B	Automatic Test Equip	1.10920
23	96B	Intelligence Analyst	1.10112
24	97B	Counterintelligence	1.05317
25	35G	Biomedical Equipment	1.03867
26	29J	Teletypewriter Equip	1.03110
27	27K	Hawk Fire Control Co	1.01056
28	75F	Personnel Information	0.98293
29	24H	Hawk Fire Control	0.97616
30	24G	Hawk Information	0.96493
31	24K	Hawk Continuous Wave	0.95386
32	98J	EW/Signal Intelligen	0.95128
33	29S	Field Commo Security	0.95103
34	91G	Behavioral Science	0.94350
35	73D	Accounting Specialist	0.90250
36	24C	Hawk Firing Section	0.90052
37	27N	Forward Area Alerting	0.88490
38	96H	Aerial Intelligence	0.87735
39	24M	Vulcan System Mechan	0.87043
40	27F	Vulcan Repairer	0.82784
41	24N	Chaparral System Mec	0.82623
42	21L	Pershing Electronics	0.81020
43	97E	Interrogator	0.69526
44	98G	EW/Signal Intelligen	0.69510
45	27B	Land Combat Support	0.65765
46	93B	Aeroscout Specialist	0.63821
47	91R	Veterinary Food Insp	0.62671
48	01H	Biological Sciences	0.61301
49	29M	Tactical Satellite/M	0.58621
50	97G	Counter-Signals Inte	0.57089

Table A.1—continued

Rank	MOS	Title	Score
51	93D	Air Traffic Control	0.56505
52	42E	Optical Laboratory	0.55230
53	29N	Telephone Central	0.52106
54	02X	Bandsman	0.51307
55	91Q	Pharmacy Specialist	0.50339
56	91W	Nuclear Medicine Spe	0.48509
57	96D	Imagery Analyst	0.46526
58	92E	Cytology Specialist	0.46145
59	71C	Executive Administra	0.43248
60	31N	Commo Systems/Circuit	0.42793
61	31F	MSE Network Switching	0.42270
62	98K	Non-Morse Interceptor	0.41883
63	95D	CID Special Agent	0.38904
64	91S	Preventive Medicine	0.38796
65	91T	Animal Care Specialist	0.37434
66	98H	Morse Interceptor	0.36856
67	67H	Observation Airplane	0.35860
68	51G	Materials Quality Spe	0.34451
69	98D	Emitter Locator Iden	0.33215
70	42C	Orthotic Specialist	0.33026
71	52E	Prime Power Product	0.31731
72	24T	PATRIOT Operator	0.31367
73	23R	Hawk Missile System	0.31311
74	27J	Hawk Field Maint Equ	0.31311
75	39G	Automated Communicat	0.31311
76	46N	Pershing Electrical	0.28228
77	68F	Aircraft Electrician	0.27601
78	68H	Aircraft Pneudraulic	0.25480
79	36M	Switching Systems Op	0.25319
80	31C	Single-Channel Radio	0.25277
81	67N	Utility Helicopter	0.24636
82	00B	Diver	0.23456
83	67Y	AH-1 Attack Helicopt	0.23221
84	55D	Explosive Ordnance	0.21043
85	68G	Aircraft Structural	0.20306
86	67V	Observation/Scout	0.19981
87	91P	Xray Specialist	0.19541
88	68B	Aircraft Powerplant	0.17498
89	67T	Tactical Transport	0.17245
90	91X	Health Physics Spec	0.16747
91	68D	Aircraft Powertrain	0.16368
92	74F	Programmer/Analyst	0.15023
93	93C	Air Traffic Control	0.14572
94	67U	Medium Helicopter Rep	0.12912
95	16D	Hawk Missile Crewmem	0.11423
96	31D	MSE Transmission Sys	0.10690
97	96R	Ground Surveillance	0.09785
98	39E	Special Electronics	0.09177
99	13M	Multiple Launch Rock	0.07149
100	42D	Dental Laboratory Spe	0.06409
101	13F	Fire Support Special	0.05898
102	27T	Pedestal Mounted	0.05442
103	81Q	Terrain Analyst	0.05151
104	74D	Computer/Machine Oper	0.04942
105	13P	MLRS/LANCE Operation	0.04341
106	68Q	Avionic Flight Sys	0.02360
107	88L	Watercraft Engineer	0.01171

Table A.1—continued

Rank	MOS	Title	Score
108	13N	LANCE Crewmember	0.01065
109	15E	Pershing Missile Crew	–0.00053
110	55R	Ammunition Stock	–0.00455
111	55G	Nuclear Weapons Spec	–0.00656
112	91L	Occupational Therapy	–0.01034
113	67R	AH-64 Attack Helicop	–0.02306
114	68R	Avionic Radar Repair	–0.03531
115	63G	Fuel & Electrical Sys	–0.07381
116	25R	Visual Info/Audio	–0.07493
117	27H	Hawk Firing Section	–0.07493
118	67S	Scout Helicopter Rep	–0.07864
119	88N	Traffic Management	–0.08255
120	63Y	Track Vehicle Mechan	–0.08426
121	91F	Psychiatric Specialist	–0.08466
122	63S	Heavy Wheel Vehicle	–0.09439
123	63T	Bradley Fighting Veh	–0.10059
124	68L	Avionic Communication	–0.10134
125	16E	Hawk Fire Control	–0.10273
126	45G	Fire Control Systems	–0.10527
127	68J	Aircraft Armament	–0.11320
128	91Y	Eye Specialist	–0.12264
129	63D	Self-Propelled FA Sys	–0.12332
130	25Q	Graphics Documentation	–0.12846
131	25S	Still Documentation	–0.12846
132	92B	Medical Laboratory	–0.13838
133	13R	FA Firefinder Radar	–0.16257
134	91N	Cardiac Specialist	–0.18267
135	91J	Physical Therapy Spec	–0.18357
136	16P	Chaparral Crewmember	–0.18758
137	71M	Chaplain Assistant	–0.20776
138	16R	Vulcan Crewmember	–0.22462
139	88K	Watercraft Operator	–0.23680
140	93P	Aviations Operations	–0.23697
141	16J	Defense Acquisition	–0.24158
142	91H	Orthopedic Specialist	–0.27163
143	91C	Practical Nurse	–0.27555
144	95B	Military Police	–0.29226
145	25L	AN/TSQ 73 Ada Com	–0.29639
146	44E	Machinist	–0.31440
147	71L	Administrative Spec	–0.31728
148	31Q	Tactical Satellite	–0.31735
149	55B	Ammunition Specialist	–0.32269
150	45K	Tank Turret Repairer	–0.33023
151	91D	Operating Room Spec	–0.33508
152	63E	M1 Abrams Tank Sys	–0.33512
153	68N	Avionic Mechanic	–0.33780
154	73C	Finance Specialist	–0.33964
155	82B	Construction Surveyor	–0.34314
156	31V	Unit-Level Communicat	–0.34909
157	94F	Hospital Food Service	–0.36314
158	63N	M60A1/A3 Tank System	–0.38633
159	91U	Ear Nose & Throat	–0.39734
160	31M	Multichannel Commo	–0.39734
161	25P	Visual Info/Audio	–0.39846
162	45E	M1 Abrams Tank Turret	–0.40022
163	91E	Dental Specialist	–0.40062
164	75B	Personnel Administra	–0.40236

Table A.1—continued

Rank	MOS	Title	Score
165	75C	Personnel Management	–0.41272
166	75D	Personnel Records Spec	–0.41956
167	75E	Personnel Actions Spec	–0.42021
168	76C	Equipment Records	–0.42751
169	93F	FA Meteorological Crew	–0.43421
170	71G	Patient Administration	–0.43833
171	21G	Pershing Electronics	–0.43881
172	91A	Medical Specialist	–0.44204
173	16T	PATRIOT Missile Crew	–0.44753
174	91V	Respiratory Specialist	–0.45098
175	82D	Topographic Surveyor	–0.45355
176	52C	Utilities Equipment	–0.45786
177	45N	M60A1/A3 Tank Turret	–0.45821
178	52D	Power-Generation Equip	–0.46573
179	45L	Artillery Repairer	–0.47539
180	52F	Turbine Engine Drive	–0.47565
181	82C	FA Surveyor	–0.48700
182	45D	Self-Propelled FA	–0.51505
183	76Y	Unit Supply Specialist	–0.52621
184	51R	Interior Electrician	–0.54293
185	27G	Chaparral/Redeye Rep	–0.54990
186	81B	Technical Drafting	–0.56249
187	13E	Cannon Fire Direction	–0.56594
188	54B	Chemical Operations	–0.58616
189	27E	TOW/Dragon Repairer	–0.58756
190	77L	Petroleum Laboratory	–0.60657
191	19K	M1 Armor Crewman	–0.61569
192	13C	Tacfire Operations	–0.63044
193	72G	Automatic Data Telect	–0.65485
194	76J	Medical Supply Spec	–0.66923
195	27L	LANCE System Repairer	–0.70767
196	19E	M60 Armor Crewman	–0.72962
197	45T	Bradley Fighting Veh	–0.74306
198	19D	Cavalry Scout	–0.75986
199	72E	Tactical Telecommuni	–0.76843
200	51M	Fire Fighter	–0.77034
201	11B	Infantryman	–0.77680
202	11C	Indirect Fire Infant	–0.78143
203	27M	MLRS Repairer	–0.78964
204	11H	Heavy Antiarmor Weap	–0.78980
205	41C	Fire Control Instrum	–0.83030
206	43E	Parachute Rigger	–0.84053
207	31L	Wire Systems Install	–0.85339
208	31K	Combat Signaler	–0.85635
209	51K	Plumber	–0.87878
210	62G	Quarrying Specialist	–0.88140
211	62E	Heavy Construction	–0.88817
212	11M	Fighting Vehicle Inf	–0.88823
213	62J	General Construction	–0.90802
214	51B	Carpentry & Masonry	–0.93806
215	62F	Crane Operator	–0.95994
216	12C	Bridge Crewman	–0.97052
217	77F	Petroleum Supply Spec	–0.97075
218	12B	Combat Engineer	–0.98090
219	76P	Material Control	–0.99253

Table A.1—continued

Rank	MOS	Title	Score
220	77W	Water Treatment Spec	–1.00422
221	57F	Graves Registration	–1.03877
222	12F	Engineer Tracked Veh	–1.04200
223	16S	MANPADS/STINGER Crew	–1.06330
224	63B	Light Wheel Vehicle	–1.06670
225	88H	Cargo Specialist	–1.07030
226	76V	Material Storage	–1.07390
227	45B	Small Arms Repairer	–1.09280
228	62H	Concrete & Asphalt	–1.10710
229	63H	Track Vehicle Repair	–1.12060
230	88M	Motor Transport Oper	–1.12440
231	62B	Construction Equipment	–1.15470
232	44B	Metal Worker	–1.16360
233	63W	Wheel Vehicle Repair	–1.16930
234	63J	Quartermaster & Chem	–1.18420
235	94B	Food Service Special	–1.20980
236	81C	Cartographer	–1.21970
237	83E	Photo & Layout Spec	–1.29770
238	13B	Cannon Crewman	–1.29910
239	76X	Subsistence Supply	–1.42440
240	83F	Printing & Bindery	–1.42950
241	43M	Fabric Repair Spec	–1.59390
242	57E	Laundry & Bath Spec	–1.64570

Table A.2

MOS Ranked on Factor 2, Civilian Exchangeability

Rank	MOS	Title	Score
1	77F	Petroleum Supply Spec	1.67702
2	25P	Visual Info/Audio Do	1.52759
3	25S	Still Documentation	1.52759
4	94B	Food Service Special	1.52759
5	76X	Subsistence Supply	1.37815
6	93P	Aviations Operations	1.32792
7	31N	Commo Systems/Circui	1.22871
8	76V	Material Storage	1.22871
9	92B	Medical Laboratory	1.22745
10	91F	Psychiatric Specialist	1.12825
11	12B	Combat Engineer	1.07928
12	44B	Metal Worker	1.07928
13	71L	Administrative Spec	1.07928
14	52E	Prime Power Production	1.02904
15	43M	Fabric Repair Spec	0.92984
16	81C	Cartographer	0.92984
17	46R	Broadcast Journalist	0.87961
18	63W	Wheel Vehicle Repair	0.87961
19	75B	Personnel Administra	0.87961
20	76J	Medical Supply Spec	0.87961
21	76P	Material Control	0.87961
22	94F	Hospital Food Service	0.87961
23	95B	Military Police	0.87961
24	98C	EW/Signal Intelligen	0.82937
25	29N	Telephone Central	0.78041
26	29V	Strategic Microwave	0.78041
27	75C	Personnel Management	0.78041
28	88M	Motor Transport Oper	0.78041
29	29M	Tactical Satellite/M	0.73017
30	31L	Wire Systems Install	0.73017
31	62G	Quarrying Specialist	0.73017
32	62J	General Construction	0.73017
33	71G	Patient Administrati	0.73017
34	52D	Power-Generation Equ	0.67994
35	62B	Construction Equipme	0.67994
36	77W	Water Treatment Spec	0.67994
37	88H	Cargo Specialist	0.67994
38	88N	Traffic Management	0.67994
39	91A	Medical Specialist	0.67994
40	91S	Preventive Medicine	0.67994
41	91T	Animal Care Specialist	0.67994
42	98J	EW/Signal Intelligence	0.67994
43	74F	Programmer/Analyst	0.62970
44	29Y	SATCOM Systems Repair	0.58073
45	35G	Biomedical Equipment	0.58073
46	46Q	Journalist	0.58073
47	83E	Photo & Layout Spec	0.58073
48	88K	Watercraft Operator	0.58073
49	91N	Cardiac Specialist	0.58073
50	82D	Topographic Surveyor	0.57947
51	29E	Radio Repairer	0.53050
52	33P	EW/Intercept Strateg	0.53050
53	33T	EW/Intercept Tactical	0.53050
54	35H	TMDE Maintenance Sup	0.53050

Table A.2—continued

Rank	MOS	Title	Score
55	51B	Carpentry & Masonry	0.53050
56	51R	Interior Electrician	0.53050
57	62H	Concrete & Asphalt	0.53050
58	68N	Avionic Mechanic	0.53050
59	71E	Court Reporter	0.53050
60	83F	Printing & Bindery	0.53050
61	81B	Technical Drafting	0.48027
62	82B	Construction Surveyor	0.48027
63	91P	Xray Specialist	0.48027
64	57E	Laundry & Bath Spec	0.43130
65	62F	Crane Operator	0.43130
66	92E	Cytology Specialist	0.43003
67	33V	EW/Intercept Aerial	0.38106
68	36L	Transportable Automa	0.38106
69	51K	Plumber	0.38106
70	52C	Utilities Equipment	0.38106
71	62E	Heavy Construction	0.38106
72	73D	Accounting Specialist	0.38106
73	88L	Watercraft Engineer	0.38106
74	95D	CID Special Agent	0.38106
75	97G	Counter-Signals Intel	0.38106
76	98G	EW/Signal Intelligence	0.38106
77	01H	Biological Sciences	0.33083
78	29J	Teletypewriter Equip	0.33083
79	29S	Field Commo Security	0.33083
80	33R	EW/Intercept Aviat	0.33083
81	44E	Machinist	0.33083
82	51M	Fire Fighter	0.33083
83	52F	Turbine Engine Drive	0.33083
84	63H	Track Vehicle Repair	0.33083
85	63J	Quartermaster & Chem	0.33083
86	68G	Aircraft Structural	0.33083
87	68H	Aircraft Pneudraulic	0.33083
88	68L	Avionic Communicatio	0.33083
89	72E	Tactical Telecommuni	0.33083
90	72G	Automatic Data Telect	0.33083
91	74D	Computer/Machine Ope	0.33083
92	75D	Personnel Records Spec	0.33083
93	75E	Personnel Actions Spec	0.33083
94	91G	Behavioral Science	0.33083
95	91U	Ear Nose & Throat Spec	0.33083
96	96B	Intelligence Analyst	0.33083
97	96D	Imagery Analyst	0.33083
98	91J	Physical Therapy Spec	0.28060
99	25R	Visual Info/Audio Eq	0.23163
100	68J	Aircraft Armament/Mi	0.23163
101	76C	Equipment Records	0.23163
102	25Q	Graphics Documentati	0.18134
103	31D	MSE Transmission Sys	0.18134
104	31F	MSE Network Switchin	0.18134
105	36M	Switching Systems Op	0.18134
106	39B	Automatic Test Equip	0.18134
107	39E	Special Electronics	0.18139
108	42C	Orthotic Specialist	0.18139
109	63E	M1 Abrams Tank System	0.18139
110	63N	M60A1/A3 Tank System	0.18139
111	63T	Bradley Fighting Veh	0.18139

Table A.2—continued

Rank	MOS	Title	Score
112	68Q	Avionic Flight System	0.18139
113	68R	Avionic Radar Repair	0.18139
114	71C	Executive Administrat	0.18139
115	71D	Legal Specialist	0.18139
116	73C	Finance Specialist	0.18139
117	76Y	Unit Supply Specialist	0.18139
118	91C	Practical Nurse	0.18139
119	91E	Dental Specialist	0.18139
120	91Y	Eye Specialist	0.18139
121	63B	Light Wheel Vehicle	0.13116
122	91L	Occupational Therapy	0.13116
123	91W	Nuclear Medicine Spec	0.13116
124	93C	Air Traffic Control	0.13116
125	43E	Parachute Rigger	0.08219
126	00B	Diver	0.03196
127	31K	Combat Signaler	0.03196
128	39D	Decentralized Svc	0.03196
129	45B	Small Arms Repairer	0.03196
130	45G	Fire Control Systems	0.03196
131	57F	Graves Registration	0.03196
132	91Q	Pharmacy Specialist	0.03196
133	97E	Interrogator	0.03196
134	98H	Morse Interceptor	0.03196
135	98K	Non-Morse Interceptor	0.03196
136	39G	Automated Communicat	–0.01828
137	41C	Fire Control Instrum	–0.01828
138	55B	Ammunition Specialist	–0.01828
139	55R	Ammunition Stock Con	–0.01828
140	63D	Self-Propelled FA Sys	–0.01828
141	67H	Observation Airplane	–0.01828
142	67N	Utility Helicopter	–0.01828
143	67R	AH-64 Attack Helicop	–0.01828
144	67S	Scout Helicopter Rep	–0.01828
145	67T	Tactical Transport	–0.01828
146	67U	Medium Helicopter Rep	–0.01828
147	67V	Observation/Scout	–0.01828
148	67Y	AH-1 Attack Helicopt	–0.01828
149	68B	Aircraft Powerplant	–0.01828
150	68D	Aircraft Powertrain	–0.01828
151	68F	Aircraft Electrician	–0.01828
152	75F	Personnel Information	–0.01828
153	77L	Petroleum Laboratory	–0.01828
154	81Q	Terrain Analyst	–0.01828
155	91R	Veterinary Food Insp	–0.01828
156	91X	Health Physics Spec	–0.01828
157	82C	FA Surveyor	–0.09727
158	02X	Bandsman	–0.16772
159	12F	Engineer Tracked Veh	–0.16772
160	21L	Pershing Electronics	–0.16772
161	24H	Hawk Fire Control Rep	–0.16772
162	24K	Hawk Continuous Wave	–0.16772
163	27B	Land Combat Support	–0.16772
164	27E	TOW/Dragon Repairer	–0.16772
165	27F	Vulcan Repairer	–0.16772
166	27G	Chaparral/Redeye Rep	–0.16772
167	27J	Hawk Field Maint Equ	–0.16772
168	27K	Hawk Fire Control Co	–0.16772

Table A.2—continued

Rank	MOS	Title	Score
169	27L	LANCE System Repairer	–0.16772
170	27M	MLRS Repairer	–0.16772
171	27N	Forward Area Alerting	–0.16772
172	29F	Fixed Communications	–0.16772
173	31C	Single-Channel Radio	–0.16772
174	31M	Multichannel Commo	–0.16772
175	31Q	Tactical Satellite/M	–0.16772
176	31V	Unit-Level Communica	–0.16772
177	33Q	EW/Intercept Strateg	–0.16772
178	39C	Target Acquisition/S	–0.16772
179	39L	FA Digital Systems	–0.16772
180	39Y	FA Tactical Fire Dir	–0.16772
181	42D	Dental Laboratory Spe	–0.16772
182	42E	Optical Laboratory	–0.16772
183	46N	Pershing Electrical	–0.16722
184	54B	Chemical Operations	–0.16772
185	63G	Fuel & Electrical Sys	–0.16772
186	63S	Heavy Wheel Vehicle	–0.16772
187	63Y	Track Vehicle Mechan	–0.16772
188	71M	Chaplain Assistant	–0.16772
189	91D	Operating Room Spec	–0.16772
190	91H	Orthopedic Spec	–0.16772
191	91V	Respiratory Spec	–0.16772
192	93D	Air Traffic Control	–0.16772
193	98D	Emitter Locator Iden	–0.16772
194	45D	Self-Propelled FA Tu	–0.31715
195	45E	M1 Abrams Tank Turret	–0.31715
196	45K	Tank Turret Repairer	–0.31715
197	45L	Artillery Repairer	–0.31715
198	45N	M60A1/A3 Tank Turret	–0.31715
199	45T	Bradley Fighting Veh	–0.31715
200	51G	Materials Quality Spe	–0.31715
201	55D	Explosive Ordnance	–0.31715
202	55G	Nuclear Weapons Spec	–0.31715
203	93F	FA Meteorological Cr	–0.39615
204	27T	Pedestal Mounted Sti	–0.42023
205	12C	Bridge Crewman	–0.47523
206	27H	Hawk Firing Section Repair	–0.87457
207	24C	Hawk Firing Section Mech	–0.89469
208	24G	Hawk Information Coor	–0.89469
209	93B	Aeroscout Specialist	–1.02401
210	96F	Psychological Operat	–1.02401
211	96H	Aerial Intelligence	–1.02401
212	96R	Ground Surveillance	–1.02401
213	97B	Counterintelligence	–1.02401
214	23R	Hawk Missile System	–1.14721
215	11B	Infantryman	–1.75098
216	11C	Indirect Fire Infant	–1.75098
217	11H	Heavy Antiarmor Weap	–1.75098
218	11M	Fighting Vehicle Inf	–1.75098
219	13B	Cannon Crewman	–1.75098
220	13C	Tacfire Operations	–1.75098
221	13E	Cannon Fire Directio	–1.75098
222	13F	Fire Support Special	–1.75098
223	13M	Multiple Launch Rock	–1.75098
224	13N	LANCE Crewmember	–1.75098
225	13P	MLRS/LANCE Operation	–1.75098

Table A.2—continued

Rank	MOS	Title	Score
226	13R	FA Firefinder Radar	–1.75098
227	15E	Pershing Missile Crew	–1.75098
228	16D	Hawk Missile Crewmem	–1.75098
229	16E	Hawk Fire Control	–1.75098
230	16J	Defense Acquisition	–1.75098
231	16P	Chaparral Crewmember	–1.75098
232	16R	Vulcan Crewmember	–1.75098
233	16S	MANPADS/STINGER Crew	–1.75098
234	16T	PATRIOT Missile Crew	–1.75098
235	19D	Cavalry Scout	–1.75098
236	19E	M60 Armor Crewman	–1.75098
237	19K	M1 Armor Crewman	–1.75098
238	21G	Pershing Electronics	–1.75098
239	24M	Vulcan System Mechan	–1.75098
240	24N	Chaparral System Mech	–1.75098
241	24T	PATRIOT Operator	–1.75098
242	25L	AN/TSQ 73 Ada Com	–1.75098

Table A.3

MOS Ranked on Factor 3, Dominant Skill (Cognitive vs. Procedural)

Rank	MOS	Title	Score
1	71D	Legal Specialist	2.35364
2	76P	Material Control	2.09949
3	76Y	Unit Supply Specialist	1.79943
4	55R	Ammunition Stock Con	1.79185
5	76V	Material Storage	1.73784
6	91X	Health Physics Spec	1.71381
7	91A	Medical Specialist	1.65033
8	75C	Personnel Management	1.53904
9	93B	Aeroscout Specialist	1.48701
10	93C	Air Traffic Control	1.46587
11	71G	Patient Administration	1.46501
12	01H	Biological Sciences	1.43546
13	75E	Personnel Actions Spec	1.42794
14	76J	Medical Supply Spec	1.38619
15	91L	Occupational Therapy	1.38180
16	76C	Equipment Records	1.36683
17	71M	Chaplain Assistant	1.36287
18	91S	Preventive Medicine	1.36287
19	91C	Practical Nurse	1.30592
20	91F	Psychiatric Specialist	1.25692
21	93P	Aviations Operations	1.24319
22	97E	Interrogator	1.22173
23	75B	Personnel Administrat	1.20450
24	96B	Intelligence Analyst	1.19870
25	46Q	Journalist	1.18545
26	74F	Programmer/Analyst	1.14918
27	91G	Behavioral Science	1.14151
28	91R	Veterinary Food Insp	1.14151
29	95D	CID Special Agent	1.14151
30	75D	Personnel Records Spec	1.12952
31	88N	Traffic Management	1.11290
32	97B	Counterintelligence	1.06120
33	02X	Bandsman	1.03819
34	95B	Military Police	1.03156
35	82D	Topographic Surveyor	0.99406
36	73D	Accounting Specialist	0.97848
37	73C	Finance Specialist	0.94043
38	91J	Physical Therapy Spec	0.91499
39	98J	EW/Signal Intelligen	0.89912
40	71C	Executive Administra	0.86390
41	13E	Cannon Fire Direction	0.85720
42	98G	EW/Signal Intelligence	0.83678
43	91Y	Eye Specialist	0.82011
44	91Q	Pharmacy Specialist	0.81627
45	82C	FA Surveyor	0.79031
46	98C	EW/Signal Intelligence	0.76599
47	92E	Cytology Specialist	0.73771
48	82B	Construction Surveyor	0.73499
49	75F	Personnel Information	0.70844
50	91V	Respiratory Specialist	0.67934
51	46R	Broadcast Journalist	0.66244
52	71L	Administrative Spec	0.64477
53	31Q	Tactical Satellite/M	0.58209

Table A.3—continued

Rank	MOS	Title	Score
54	13P	MLRS/LANCE Operation	0.57961
55	25P	Visual Info/Audio	0.57792
56	25Q	Graphics Documentation	0.57792
57	25S	Still Documentation	0.57792
58	13F	Fire Support Special	0.56932
59	91U	Ear Nose & Throat Sp	0.52790
60	92B	Medical Laboratory	0.51171
61	91T	Animal Care Specialist	0.50332
62	71E	Court Reporter	0.47929
63	54B	Chemical Operations	0.47774
64	81C	Cartographer	0.46416
65	21G	Pershing Electronics	0.46243
66	76X	Subsistence Supply	0.45122
67	35G	Biomedical Equipment	0.43674
68	77F	Petroleum Supply Spec	0.42068
69	51M	Fire Fighter	0.41397
70	81B	Technical Drafting	0.40782
71	19D	Cavalry Scout	0.40756
72	96F	Psychological Operator	0.34873
73	81Q	Terrain Analyst	0.33527
74	57F	Graves Registration	0.33109
75	72E	Tactical Telecommuni	0.31994
76	88K	Watercraft Operator	0.31553
77	31M	Multichannel Commo	0.27225
78	51G	Materials Quality Spec	0.25534
79	74D	Computer/Machine Oper	0.23011
80	91D	Operating Room Spec	0.22728
81	31N	Commo Systems/Circuit	0.21411
82	55B	Ammunition Specialist	0.16325
83	96D	Imagery Analyst	0.15735
84	16J	Defense Acquisition	0.15707
85	12B	Combat Engineer	0.12617
86	27F	Vulcan Repairer	0.12148
87	27N	Forward Area Alerting	0.12148
88	77L	Petroleum Laboratory	0.09207
89	98D	Emitter Locator Iden	0.05914
90	98K	Non-Morse Interceptor	0.05562
91	31F	MSE Network Switching	0.04030
92	96H	Aerial Intelligence	0.03266
93	23R	Hawk Missile System	0.00000
94	27H	Hawk Firing Section	0.00000
95	27T	Pedestal Mounted Sti	0.00000
96	93F	FA Meteorological Crew	–0.00039
97	31V	Unit-Level Communicat	–0.00602
98	98H	Morse Interceptor	–0.01165
99	91N	Cardiac Specialist	–0.02187
100	24K	Hawk Continuous Wave	–0.02207
101	97G	Counter-Signals Intell	–0.03750
102	31C	Single-Channel Radio	–0.06069
103	00B	Diver	–0.08920
104	29M	Tactical Satellite/M	–0.11519
105	72G	Automatic Data Telect	–0.12047
106	16E	Hawk Fire Control Crew	–0.12257
107	24T	PATRIOT Operator	–0.12257
108	88M	Motor Transport Oper	–0.14725
109	16P	Chaparral Crewmember	–0.16396
110	44E	Machinist	–0.17718

Table A.3—continued

Rank	MOS	Title	Score
111	45N	M60A1/A3 Tank Turret	–0.17718
112	24H	Hawk Fire Control Rep	–0.18774
113	27E	TOW/Dragon Repairer	–0.18774
114	29N	Telephone Central Off	–0.19268
115	29V	Strategic Microwave	–0.19803
116	29Y	SATCOM Systems Repair	–0.19803
117	25R	Visual Info/Audio Equ	–0.19971
118	27J	Hawk Field Maint Equ	–0.19971
119	39G	Automated Communicat	–0.19971
120	27G	Chaparral/Redeye Rep	–0.20324
121	39D	Decentralized Svc	–0.20324
122	93D	Air Traffic Control	–0.20832
123	94F	Hospital Food Servic	–0.22151
124	88H	Cargo Specialist	–0.23434
125	45E	M1 Abrams Tank Turret	–0.24616
126	29S	Field Commo Security	–0.26581
127	45G	Fire Control Systems	–0.28628
128	29J	Teletypewriter Equip	–0.28953
129	39B	Automatic Test Equip	–0.28953
130	39C	Target Acquisition/S	–0.28953
131	36L	Transportable Automat	–0.30144
132	42E	Optical Laboratory	–0.30221
133	45T	Bradley Fighting Veh	–0.30221
134	52D	Power-Generation Equ	–0.30221
135	46N	Pershing Electrical	–0.30608
136	16R	Vulcan Crewmember	–0.31877
137	27K	Hawk Fire Control	–0.32229
138	29F	Fixed Communications	–0.32229
139	45D	Self-Propelled FA	–0.32642
140	63Y	Track Vehicle Mechan	–0.32642
141	13R	FA Firefinder Radar	–0.33636
142	52C	Utilities Equipment	–0.36367
143	45K	Tank Turret Repairer	–0.36878
144	63E	M1 Abrams Tank System	–0.36878
145	63N	M60A1/A3 Tank System	–0.36878
146	41C	Fire Control Instrum	–0.38742
147	21L	Pershing Electronics	–0.39484
148	39E	Special Electronics	–0.39484
149	36M	Switching Systems Oper	–0.39565
150	63B	Light Wheel Vehicle	–0.39766
151	91E	Dental Specialist	–0.42055
152	31D	MSE Transmission Sys	–0.42407
153	68L	Avionic Communication	–0.43111
154	68Q	Avionic Flight System	–0.43111
155	68R	Avionic Radar Repair	–0.43111
156	35H	TMDE Maintenance Sup	–0.44654
157	91W	Nuclear Medicine Spec	–0.44654
158	63D	Self-Propelled FA Sys	–0.45683
159	63S	Heavy Wheel Vehicle	–0.45683
160	52F	Turbine Engine Drive	–0.47239
161	19E	M60 Armor Crewman	–0.47339
162	63T	Bradley Fighting Veh	–0.47339
163	29E	Radio Repairer	–0.47760
164	33P	EW/Intercept Strateg	–0.47760
165	33Q	EW/Intercept Strateg	–0.47760
166	88L	Watercraft Engineer	–0.47760
167	25L	AN/TSQ 73 Ada Com	–0.47991

Table A.3—continued

Rank	MOS	Title	Score
168	13C	Tacfire Operations	–0.48505
169	16T	PATRIOT Missile Crew	–0.48505
170	11M	Fighting Vehicle Inf	–0.49310
171	55D	Explosive Ordnance	–0.50193
172	12C	Bridge Crewman	–0.50582
173	45B	Small Arms Repairer	–0.51193
174	16D	Hawk Missile Crewmem	–0.51380
175	16S	MANPADS/STINGER Crew	–0.51380
176	31K	Combat Signaler	–0.51600
177	68F	Aircraft Electrician	–0.51909
178	44B	Metal Worker	–0.52410
179	19K	M1 Armor Crewman	–0.52912
180	45L	Artillery Repairer	–0.52912
181	11B	Infantryman	–0.53607
182	55G	Nuclear Weapons Spec	–0.53607
183	68B	Aircraft Powerplant	–0.53607
184	24N	Chaparral System Mec	–0.54204
185	24C	Hawk Firing Section	–0.56428
186	68J	Aircraft Armament/Mi	–0.56565
187	24M	Vulcan System Mechan	–0.57831
188	39L	FA Digital Systems	–0.58643
189	39Y	FA Tactical Fire Dir	–0.58643
190	68N	Avionic Mechanic	–0.58643
191	33V	EW/Intercept Aerial	–0.59154
192	68D	Aircraft Powertrain	–0.63379
193	91H	Orthopedic Specialist	–0.63379
194	33R	EW/Intercept Aviation	–0.63468
195	27B	Land Combat Support	–0.63820
196	31L	Wire Systems Install	–0.63820
197	68H	Aircraft Pneudraulic	–0.63820
198	43E	Parachute Rigger	–0.66920
199	68G	Aircraft Structural	–0.66920
200	24G	Hawk Information Coor	–0.67962
201	27M	MLRS Repairer	–0.67962
202	77W	Water Treatment Spec	–0.67962
203	52E	Prime Power Production	–0.71351
204	67H	Observation Airplane	–0.72375
205	67N	Utility Helicopter	–0.72375
206	67R	AH-64 Attack Helicop	–0.72375
207	67S	Scout Helicopter Rep	–0.72375
208	67T	Tactical Transport	–0.72375
209	67U	Medium Helicopter Rep	–0.72375
210	67V	Observation/Scout	–0.72375
211	67Y	AH-1 Attack Helicopt	–0.72375
212	51R	Interior Electrician	–0.73365
213	33T	EW/Intercept Tactical	–0.73999
214	11H	Heavy Antiarmor Weap	–0.76564
215	63J	Quartermaster & Chem	–0.76564
216	42C	Orthotic Specialist	–0.77802
217	96R	Ground Surveillance	–0.77802
218	62F	Crane Operator	–0.79019
219	91P	Xray Specialist	–0.80388
220	62B	Construction Equipment	–0.84015
221	43M	Fabric Repair Spec	–0.84530
222	63H	Track Vehicle Repair	–0.85620
223	63W	Wheel Vehicle Repair	–0.85620
224	12F	Engineer Tracked Veh	–0.86274

Table A.3—continued

Rank	MOS	Title	Score
225	27L	LANCE System Repairer	–0.87643
226	94B	Food Service Special	–0.88532
227	63G	Fuel & Electrical Sys	–0.89032
228	11C	Indirect Fire Infant	–0.90328
229	51K	Plumber	–0.91926
230	13M	Multiple Launch Rock	–0.96150
231	13N	LANCE Crewmember	–0.96150
232	15E	Pershing Missile Rep	–0.96150
233	62H	Concrete & Asphalt	–0.96962
234	62E	Heavy Construction	–0.98688
235	51B	Carpentry & Masonry	–1.00583
236	57E	Laundry & Bath Spec	–1.03618
237	42D	Dental Laboratory Spec	–1.05954
238	83E	Photo & Layout Spec	–1.07091
239	13B	Cannon Crewman	–1.16121
240	62G	Quarrying Specialist	–1.16121
241	62J	General Construction	–1.16121
242	83F	Printing & Bindery	–1.16121

Table A.4

MOS Ranked on Factor 4, Per-Capita Cost

Rank	MOS	Title	Score
1	29N	Telephone Central Of	8.60393
2	24G	Hawk Information Coo	4.97999
3	24H	Hawk Fire Control Rep	3.65636
4	21L	Pershing Electronics	2.40972
5	33P	EW/Intercept Strateg	2.27479
6	24T	PATRIOT Operator	2.20624
7	33Q	EW/Intercept Strateg	2.18899
8	27F	Vulcan Repairer	2.08808
9	27B	Land Combat Support	1.98328
10	33T	EW/Intercept Tactical	1.93682
11	24K	Hawk Continuous Wave	1.57327
12	24C	Hawk Firing Section	1.39482
13	27G	Chaparral/Redeye Rep	1.38794
14	25L	AN/TSQ 73 Ada Com	1.36414
15	33R	EW/Intercept Aviation	1.29309
16	29E	Radio Repairer	1.16708
17	27N	Forward Area Alerting	1.15180
18	29V	Strategic Microwave	1.15033
19	98D	Emitter Locator Iden	1.08077
20	36L	Transportable Automat	1.06876
21	39E	Special Electronics	1.05679
22	93D	Air Traffic Control	0.97912
23	29M	Tactical Satellite/M	0.81016
24	71M	Chaplain Assistant	0.74921
25	24M	Vulcan System Mechanic	0.73097
26	95D	CID Special Agent	0.69737
27	45G	Fire Control Systems	0.68109
28	98G	EW/Signal Intelligen	0.66190
29	39D	Decentralized Svc	0.62830
30	33V	EW/Intercept Aerial	0.58732
31	39B	Automatic Test Equip	0.51046
32	27E	TOW/Dragon Repairer	0.44187
33	98H	Morse Interceptor	0.36949
34	45K	Tank Turret Repairer	0.25268
35	00B	Diver	0.22248
36	01H	Biological Sciences	0.22248
37	02X	Bandsman	0.22248
38	27K	Hawk Fire Control	0.22248
39	31D	MSE Transmission Sys	0.22248
40	31F	MSE Network Switching	0.22248
41	35G	Biomedical Equipment	0.22248
42	35H	TMDE Maintenance Sup	0.22248
43	39C	Target Acquisition/S	0.22248
44	39L	FA Digital Systems	0.22248
45	39Y	FA Tactical Fire Dir	0.22248
46	42E	Optical Laboratory	0.22248
47	46Q	Journalist	0.22248
48	46R	Broadcast Journalist	0.22248
49	51M	Fire Fighter	0.22248
50	52E	Prime Power Production	0.22248
51	67H	Observation Airplane	0.22248
52	67N	Utility Helicopter	0.22248
53	67R	AH-64 Attack Helicop	0.22248
54	67S	Scout Helicopter Rep	0.22248

Table A.4—continued

Rank	MOS	Title	Score
55	67T	Tactical Transport	0.22248
56	67U	Medium Helicopter Rep	0.22248
57	67V	Observation/Scout	0.22248
58	67Y	AH-1 Attack Helicopter	0.22248
59	68B	Aircraft Powerplant	0.22248
60	68D	Aircraft Powertrain	0.22248
61	68F	Aircraft Electrician	0.22248
62	68G	Aircraft Structural	0.22248
63	68H	Aircraft Pneudraulic	0.22248
64	68J	Aircraft Armament/Mi	0.22248
65	68L	Avionic Communication	0.22248
66	68N	Avionic Mechanic	0.22248
67	68Q	Avionic Flight Sys	0.22248
68	68R	Avionic Radar Repair	0.22248
69	71E	Court Reporter	0.22248
70	81B	Technical Drafting	0.22248
71	81C	Cartographer	0.22248
72	81Q	Terrain Analyst	0.22248
73	82B	Construction Surveyor	0.22248
74	82D	Topographic Surveyor	0.22248
75	83E	Photo & Layout Spec	0.22248
76	83F	Printing & Bindery	0.22248
77	88H	Cargo Specialist	0.22248
78	88K	Watercraft Operator	0.22248
79	88L	Watercraft Engineer	0.22248
80	88M	Motor Transport Oper	0.22248
81	88N	Traffic Management	0.22248
82	91C	Practical Nurse	0.22248
83	91T	Animal Care Specialist	0.22248
84	91W	Nuclear Medicine Spec	0.22248
85	91X	Health Physics Spec	0.22248
86	92E	Cytology Specialist	0.22248
87	93B	Aeroscout Specialist	0.22248
88	93C	Air Traffic Control	0.22248
89	93F	FA Meteorological Crew	0.22248
90	93P	Aviations Operations	0.22248
91	95B	Military Police	0.22248
92	97G	Counter-Signals Intel	0.22248
93	98C	EW/Signal Intelligence	0.22248
94	98K	Non-Morse Interceptor	0.22248
95	42D	Dental Laboratory Spec	0.20626
96	27H	Hawk Firing Section	0.20125
97	29F	Fixed Communications	0.19142
98	42C	Orthotic Specialist	0.16746
99	98J	EW/Signal Intelligence	0.15455
100	63G	Fuel & Electrical Sys	0.13518
101	46N	Pershing Electrical	0.11915
102	54B	Chemical Operations	0.08556
103	55G	Nuclear Weapons Spec	0.06775
104	45T	Bradley Fighting Veh	0.06347
105	29J	Teletypewriter Equip	0.05905
106	74F	Programmer/Analyst	0.03193
107	77L	Petroleum Laboratory	0.02904
108	44B	Metal Worker	0.01871
109	23R	Hawk Missile System	0.00000
110	25P	Visual Info/Audio	0.00000
111	25Q	Graphics Documentation	0.00000

Table A.4—continued

Rank	MOS	Title	Score
112	25R	Visual Info/Audio Equip	0.00000
113	25S	Still Documentation	0.00000
114	27J	Hawk Field Maint Equip	0.00000
115	27T	Pedestal Mounted Sti	0.00000
116	39G	Automated Communicat	0.00000
117	21G	Pershing Electronics	–0.00327
118	63H	Track Vehicle Repair	–0.03719
119	29Y	SATCOM Systems Repair	–0.05573
120	45N	M60A1/A3 Tank Turret	–0.11441
121	63W	Wheel Vehicle Repair	–0.12829
122	27M	MLRS Repairer	–0.14420
123	45E	M1 Abrams Tank Turret	–0.15196
124	63E	M1 Abrams Tank Sys	–0.16685
125	31M	Multichannel Commo	–0.16867
126	41C	Fire Control Instrum	–0.16879
127	63T	Bradley Fighting Veh	–0.17206
128	71C	Executive Administrat	–0.19161
129	96F	Psychological Operat	–0.20489
130	29S	Field Commo Security	–0.20793
131	44E	Machinist	–0.21210
132	72G	Automatic Data Telect	–0.21665
133	55D	Explosive Ordnance	–0.23497
134	63Y	Track Vehicle Mechanic	–0.23776
135	96D	Imagery Analyst	–0.24026
136	92B	Medical Laboratory	–0.25362
137	51G	Materials Quality Spec	–0.25372
138	63N	M60A1/A3 Tank System	–0.26473
139	16T	PATRIOT Missile Crew	–0.28348
140	31C	Single-Channel Radio	–0.28444
141	45L	Artillery Repairer	–0.31801
142	31N	Commo Systems/Circuit	–0.31810
143	91Q	Pharmacy Specialist	–0.33030
144	96H	Aerial Intelligence	–0.34225
145	27L	LANCE System Repairer	–0.35021
146	91G	Behavioral Science	–0.35358
147	63J	Quartermaster & Chem	–0.37360
148	74D	Computer/Machine Ope	–0.38245
149	91S	Preventive Medicine	–0.38325
150	91L	Occupational Therapy	–0.38593
151	52C	Utilities Equipment	–0.39702
152	72E	Tactical Telecommuni	–0.40076
153	43E	Parachute Rigger	–0.42520
154	71D	Legal Specialist	–0.42842
155	91V	Respiratory Specialist	–0.43345
156	31Q	Tactical Satellite/M	–0.43581
157	15E	Pershing Missile Rep	–0.43788
158	13R	FA Firefinder Radar	–0.43945
159	75C	Personnel Management	–0.44150
160	91P	Xray Specialist	–0.45528
161	91J	Physical Therapy Spec	–0.46743
162	75F	Personnel Information	–0.46755
163	73D	Accounting Specialist	–0.47175
164	52F	Turbine Engine Drive	–0.47212
165	97B	Counterintelligence	–0.48600
166	13B	Cannon Crewman	–0.49314
167	82C	FA Surveyor	–0.49383
168	12F	Engineer Tracked Veh	–0.49638

Table A.4—continued

Rank	MOS	Title	Score
169	24N	Chaparral System Mech	–0.50724
170	16E	Hawk Fire Control Crew	–0.51031
171	31V	Unit-Level Communica	–0.51944
172	45B	Small Arms Repairer	–0.52405
173	51B	Carpentry & Masonry	–0.53865
174	77W	Water Treatment Spec	–0.54324
175	31K	Combat Signaler	–0.54777
176	97E	Interrogator	–0.54834
177	77F	Petroleum Supply Spec	–0.55428
178	16D	Hawk Missile Crewmem	–0.55918
179	13N	LANCE Crewmember	–0.55964
180	13P	MLRS/LANCE Operation	–0.55964
181	19D	Cavalry Scout	–0.55964
182	19E	M60 Armor Crewman	–0.55964
183	52D	Power-Generation Equip	–0.56825
184	31L	Wire Systems Install	–0.56949
185	16J	Defense Acquisition	–0.57415
186	57F	Graves Registration	–0.57799
187	36M	Switching Systems Oper	–0.58176
188	73C	Finance Specialist	–0.59016
189	11M	Fighting Vehicle Inf	–0.59260
190	13M	Multiple Launch Rock	–0.59408
191	19K	M1 Armor Crewman	–0.59484
192	12C	Bridge Crewman	–0.60138
193	12B	Combat Engineer	–0.60223
194	75B	Personnel Administrat	–0.60454
195	11H	Heavy Antiarmor Weap	–0.61107
196	45D	Self-Propelled FA	–0.61838
197	11B	Infantryman	–0.62553
198	96B	Intelligence Analyst	–0.63494
199	11C	Indirect Fire Infant	–0.63659
200	16P	Chaparral Crewmember	–0.63997
201	94B	Food Service Special	–0.65397
202	76C	Equipment Records	–0.65555
203	43M	Fabric Repair Spec	–0.66611
204	55B	Ammunition Specialist	–0.67164
205	16S	MANPADS/STINGER Crew	–0.67694
206	91A	Medical Specialist	–0.68493
207	63B	Light Wheel Vehicle	–0.69207
208	13F	Fire Support Spec	–0.69777
209	16R	Vulcan Crewmember	–0.70083
210	91R	Veterinary Food Insp	–0.70353
211	96R	Ground Surveillance	–0.72653
212	63D	Self-Propelled FA Sys	–0.73122
213	13E	Cannon Fire Direction	–0.74773
214	57E	Laundry & Bath Spec	–0.76099
215	71G	Patient Administration	–0.76851
216	76V	Material Storage	–0.77176
217	71L	Administrative Spec	–0.77247
218	76P	Material Control	–0.78847
219	55R	Ammunition Stock Con	–0.78876
220	63S	Heavy Wheel Vehicle	–0.79078
221	76X	Subsistence Supply	–0.79921
222	76Y	Unit Supply Specialist	–0.79983
223	13C	Tacfire Operations	–0.80010
224	91F	Psychiatric Specialist	–0.83480
225	75E	Personnel Actions Spec	–0.85220

Table A.4—continued

Rank	MOS	Title	Score
226	91H	Orthopedic Specialist	–0.86009
227	94F	Hospital Food Service	–0.87042
228	91D	Operating Room Spec	–0.87578
229	75D	Personnel Records Spec	–0.88333
230	91Y	Eye Specialist	–0.88710
231	91U	Ear Nose & Throat Spec	–0.89018
232	91E	Dental Specialist	–0.89085
233	76J	Medical Supply Spec	–0.93737
234	62G	Quarrying Specialist	–0.95926
235	62F	Crane Operator	–0.98134
236	62E	Heavy Construction	–0.98294
237	91N	Cardiac Specialist	–0.98463
238	51K	Plumber	–0.98712
239	51R	Interior Electrician	–0.99159
240	62H	Concrete & Asphalt	–0.99376
241	62J	General Construction	–0.99531
242	62B	Construction Equipment	–1.00172

Table A.5

MOS Ranked on Factor 5, Academic Credit

Rank	MOS	Title	Score
1	91V	Respiratory Specialist	2.36005
2	21L	Pershing Electronics	1.63955
3	71E	Court Reporter	1.55949
4	91W	Nuclear Medicine Spec	1.39938
5	35H	TMDE Maintenance Sup	1.31933
6	71C	Executive Administrat	1.31933
7	91E	Dental Specialist	1.31933
8	93C	Air Traffic Control	1.31933
9	24G	Hawk Information Coor	1.23927
10	42D	Dental Laboratory Spec	1.23927
11	68B	Aircraft Powerplant	1.15922
12	68D	Aircraft Powertrain	1.15922
13	68F	Aircraft Electrician	1.15922
14	91T	Animal Care Specialist	1.15922
15	24K	Hawk Continuous Wave	0.99911
16	24H	Hawk Fire Control Rep	0.91905
17	24T	PATRIOT Operator	0.91905
18	44B	Metal Worker	0.91905
19	51G	Materials Quality Spec	0.91905
20	52E	Prime Power Production	0.91905
21	35G	Biomedical Equipment	0.83900
22	45G	Fire Control Systems	0.83900
23	45L	Artillery Repairer	0.83900
24	93P	Aviations Operations	0.83900
25	96D	Imagery Analyst	0.83900
26	97E	Interrogator	0.83900
27	45N	M60A1/A3 Tank Turret	0.75894
28	68G	Aircraft Structural	0.75894
29	81B	Technical Drafting	0.75894
30	92B	Medical Laboratory	0.75894
31	97G	Counter-Signals Intel	0.75894
32	24C	Hawk Firing Section	0.67889
33	25L	AN/TSQ 73 Ada Com	0.67889
34	44E	Machinist	0.67889
35	63B	Light Wheel Vehicle	0.67889
36	68H	Aircraft Pneudraulic	0.67889
37	71D	Legal Specialist	0.67889
38	71G	Patient Administration	0.67889
39	76Y	Unit Supply Specialist	0.67889
40	82D	Topographic Surveyor	0.67889
41	51B	Carpentry & Masonry	0.60229
42	00B	Diver	0.59883
43	62B	Construction Equipment	0.59883
44	71L	Administrative Spec	0.59883
45	71M	Chaplain Assistant	0.59883
46	74D	Computer/Machine Oper	0.59883
47	76P	Material Control	0.59883
48	98J	EW/Signal Intelligence	0.59883
49	62J	General Construction	0.52224
50	41C	Fire Control Instrum	0.51877
51	45D	Self-Propelled FA	0.51877
52	45E	M1 Abrams Tank Turret	0.51877
53	76J	Medical Supply Spec	0.51877
54	93F	FA Meteorological Crew	0.51877

Table A.5—continued

Rank	MOS	Title	Score
55	98C	EW/Signal Intelligence	0.51877
56	11H	Heavy Antiarmor Weap	0.43872
57	13E	Cannon Fire Direction	0.43872
58	19D	Cavalry Scout	0.43872
59	19K	M1 Armor Crewman	0.43872
60	29N	Telephone Central Off	0.43872
61	31V	Unit-Level Communicat	0.43872
62	43E	Parachute Rigger	0.43872
63	67N	Utility Helicopter	0.43872
64	72E	Tactical Telecommuni	0.43872
65	83E	Photo & Layout Spec	0.43872
66	83F	Printing & Bindery	0.43872
67	91J	Physical Therapy Spec	0.43872
68	94F	Hospital Food Service	0.43872
69	13C	Tacfire Operations	0.35866
70	13F	Fire Support Spec	0.35866
71	73C	Finance Specialist	0.35866
72	73D	Accounting Specialist	0.35866
73	75D	Personnel Records Spec	0.35866
74	76X	Subsistence Supply	0.35866
75	94B	Food Service Spec	0.35866
76	96H	Aerial Intelligence	0.35866
77	21G	Pershing Electronics	0.27861
78	24M	Vulcan System Mechanic	0.27861
79	45B	Small Arms Repairer	0.27861
80	75E	Personnel Actions Spec	0.27861
81	75F	Personnel Information	0.27861
82	76C	Equipment Records	0.27861
83	11B	Infantryman	0.19855
84	11C	Indirect Fire Infant	0.19855
85	19E	M60 Armor Crewman	0.19855
86	27B	Land Combat Support	0.19855
87	27E	TOW/Dragon Repairer	0.19855
88	27F	Vulcan Repairer	0.19855
89	27G	Chaparral/Redeye Rep	0.19855
90	31D	MSE Transmission Sys	0.19855
91	45K	Tank Turret Repairer	0.19855
92	46N	Pershing Electrical	0.19855
93	52C	Utilities Equipment	0.19855
94	52D	Power-Generation Equ	0.19855
95	52F	Turbine Engine Drive	0.19855
96	67H	Observation Airplane	0.19855
97	72G	Automatic Data Telect	0.19855
98	75B	Personnel Administrat	0.19855
99	75C	Personnel Management	0.19855
100	76V	Material Storage	0.19855
101	81C	Cartographer	0.19855
102	96B	Intelligence Analyst	0.19855
103	12F	Engineer Tracked Veh	0.11850
104	13B	Cannon Crewman	0.11850
105	15E	Pershing Missile Rep	0.11850
106	57F	Graves Registration	0.11850
107	82C	FA Surveyor	0.11850
108	63J	Quartermaster & Chem	0.03844
109	01H	Biological Sciences	–0.04161
110	02X	Bandsman	–0.04161
111	11M	Fighting Vehicle Inf	–0.04161

Table A.5—continued

Rank	MOS	Title	Score
112	13R	FA Firefinder Radar	–0.04161
113	16J	Defense Acquisition	–0.04161
114	29E	Radio Repairer	–0.04161
115	29F	Fixed Communications	–0.04161
116	29J	Teletypewriter Equip	–0.04161
117	29M	Tactical Satellite/M	–0.04161
118	29S	Field Commo Security	–0.04161
119	29V	Strategic Microwave	–0.04161
120	29Y	SATCOM Systems Repair	–0.04161
121	31Q	Tactical Satellite/M	–0.04161
122	36L	Transportable Automat	–0.04161
123	39C	Target Acquisition/S	–0.04161
124	39D	Decentralized Svc	–0.04161
125	39E	Special Electronics	–0.04161
126	39Y	FA Tactical Fire Dir	–0.04161
127	42C	Orthotic Specialist	–0.04161
128	42E	Optical Laboratory	–0.04161
129	51M	Fire Fighter	–0.04161
130	63E	M1 Abrams Tank System	–0.04161
131	67R	AH-64 Attack Helicop	–0.04161
132	67S	Scout Helicopter Rep	–0.04161
133	67T	Tactical Transport	–0.04161
134	67U	Medium Helicopter Rep	–0.04161
135	67V	Observation/Scout He	–0.04161
136	67Y	AH-1 Attack Helicopt	–0.04161
137	68J	Aircraft Armament/Mi	–0.04161
138	74F	Programmer/Analyst	–0.04161
139	82B	Construction Surveyo	–0.04161
140	88N	Traffic Management	–0.04161
141	91A	Medical Specialist	–0.04161
142	91C	Practical Nurse	–0.04161
143	91D	Operating Room Spec	–0.04161
144	91F	Psychiatric Specialist	–0.04161
145	91G	Behavioral Science	–0.04161
146	91L	Occupational Therapy	–0.04161
147	91N	Cardiac Specialist	–0.04161
148	91P	Xray Specialist	–0.04161
149	91Q	Pharmacy Specialist	–0.04161
150	91R	Veterinary Food Insp	–0.04161
151	91S	Preventive Medicine	–0.04161
152	91U	Ear Nose & Throat Spec	–0.04161
153	91Y	Eye Specialist	–0.04161
154	93D	Air Traffic Control	–0.04161
155	95B	Military Police	–0.04161
156	98G	EW/Signal Intelligence	–0.04161
157	31L	Wire Systems Install	–0.27832
158	62E	Heavy Construction	–0.27832
159	62F	Crane Operator	–0.27832
160	43M	Fabric Repair Spec	–0.35837
161	51K	Plumber	–0.35837
162	63D	Self-Propelled FA Sys	–0.35837
163	63G	Fuel & Electrical Sys	–0.35837
164	63H	Track Vehicle Repair	–0.35837
165	63N	M60A1/A3 Tank System	–0.35837
166	63S	Heavy Wheel Vehicle	–0.35837
167	63T	Bradley Fighting Veh	–0.35837
168	63W	Wheel Vehicle Repair	–0.35837

Table A.5—continued

Rank	MOS	Title	Score
169	63Y	Track Vehicle Mechan	–0.35837
170	55G	Nuclear Weapons Spec	–0.51848
171	88K	Watercraft Operator	–0.51848
172	33P	EW/Intercept Strateg	–0.59854
173	33Q	EW/Intercept Strateg	–0.59854
174	33R	EW/Intercept Aviation	–0.59854
175	33T	EW/Intercept Tactical	–0.59854
176	33V	EW/Intercept Aerial	–0.59854
177	55B	Ammunition Specialist	–0.59854
178	88L	Watercraft Engineer	–0.59854
179	57E	Laundry & Bath Spec	–0.67859
180	62G	Quarrying Specialist	–0.67859
181	62H	Concrete & Asphalt	–0.67859
182	51R	Interior Electrician	–0.75865
183	55D	Explosive Ordnance	–0.75865
184	88H	Cargo Specialist	–0.75865
185	12B	Combat Engineer	–0.83871
186	12C	Bridge Crewman	–0.83871
187	16T	PATRIOT Missile Crew	–0.83871
188	27L	LANCE System Repairer	–0.83871
189	27M	MLRS Repairer	–0.83871
190	27N	Forward Area Alerting	–0.83871
191	55R	Ammunition Stock Con	–0.83871
192	88M	Motor Transport Oper	–0.83871
193	24N	Chaparral System Mec	–0.91876
194	31M	Multichannel Commo	–0.99882
195	31N	Commo Systems/Circuit	–0.99882
196	13M	Multiple Launch Rock	–1.07887
197	13N	LANCE Crewmember	–1.07887
198	13P	MLRS/LANCE Operation	–1.07887
199	16D	Hawk Missile Crewmem	–1.07887
200	16E	Hawk Fire Control Crew	–1.07887
201	16P	Chaparral Crewmember	–1.07887
202	16R	Vulcan Crewmember	–1.07887
203	16S	MANPADS/STINGER Crew	–1.07887
204	23R	Hawk Missile System	–1.07887
205	25P	Visual Info/Audio Do	–1.07887
206	25Q	Graphics Documentati	–1.07887
207	25R	Visual Info/Audio Equ	–1.07887
208	25S	Still Documentation	–1.07887
209	27H	Hawk Firing Section	–1.07887
210	27J	Hawk Field Maint Equ	–1.07887
211	27K	Hawk Fire Control Co	–1.07887
212	27T	Pedestal Mounted Sti	–1.07887
213	31C	Single-Channel Radio	–1.07887
214	31F	MSE Network Switching	–1.07887
215	31K	Combat Signaler	–1.07887
216	36M	Switching Systems Op	–1.07887
217	39B	Automatic Test Equip	–1.07887
218	39G	Automated Communicat	–1.07887
219	39L	FA Digital Systems	–1.07887
220	45T	Bradley Fighting Veh	–1.07887
221	46Q	Journalist	–1.07887
222	46R	Broadcast Journalist	–1.07887
223	54B	Chemical Operations	–1.07887
224	68L	Avionic Communication	–1.07887
225	68N	Avionic Mechanic	–1.07887

Table A.5—continued

Rank	MOS	Title	Score
226	68Q	Avionic Flight Sys	–1.07887
227	68R	Avionic Radar Repair	–1.07887
228	77F	Petroleum Supply Spec	–1.07887
229	77L	Petroleum Laboratory	–1.07887
230	77W	Water Treatment Spec	–1.07887
231	81Q	Terrain Analyst	–1.07887
232	91H	Orthopedic Specialist	–1.07887
233	91X	Health Physics Spec	–1.07887
234	92E	Cytology Specialist	–1.07887
235	93B	Aeroscout Specialist	–1.07887
236	95D	CID Special Agent	–1.07887
237	96F	Psychological Operator	–1.07887
238	96R	Ground Surveillance	–1.07887
239	97B	Counterintelligence	–1.07887
240	98D	Emitter Locator Iden	–1.07887
241	98H	Morse Interceptor	–1.07887
242	98K	Non-Morse Interceptor	–1.07887

Table A.6

MOS Ranked on Factor 6, Vocational Credit

Rank	MOS	Title	Score
1	91V	Respiratory Specialist	2.81998
2	91C	Practical Nurse	2.46358
3	42C	Orthotic Specialist	2.36852
4	71E	Court Reporter	2.15458
5	91T	Animal Care Specialist	1.86941
6	91W	Nuclear Medicine Spec	1.67929
7	35H	TMDE Maintenance Sup	1.58423
8	71C	Executive Administrat	1.58423
9	91E	Dental Specialist	1.58423
10	93C	Air Traffic Control	1.58423
11	24G	Hawk Information Coor	1.48918
12	42D	Dental Laboratory Spec	1.48918
13	68B	Aircraft Powerplant	1.39412
14	68D	Aircraft Powertrain	1.39412
15	68F	Aircraft Electrician	1.39412
16	81C	Cartographer	1.39412
17	82D	Topographic Surveyor	1.39412
18	92B	Medical Laboratory	1.39412
19	97E	Interrogator	1.39412
20	24K	Hawk Continuous Wave	1.20400
21	42E	Optical Laboratory	1.13277
22	21L	Pershing Electronics	1.10895
23	24H	Hawk Fire Control Rep	1.10895
24	24T	PATRIOT Operator	1.10895
25	44B	Metal Worker	1.10895
26	71D	Legal Specialist	1.10895
27	94F	Hospital Food Service	1.10895
28	45L	Artillery Repairer	1.01389
29	93P	Aviations Operations	1.01389
30	96D	Imagery Analyst	1.01389
31	24C	Hawk Firing Section	0.91883
32	45N	M60A1/A3 Tank Turret	0.91883
33	68G	Aircraft Structural	0.91883
34	97G	Counter-Signals Intel	0.91883
35	25L	AN/TSQ 73 Ada Com	0.82377
36	44E	Machinist	0.82377
37	52C	Utilities Equipment	0.82377
38	52E	Prime Power Production	0.82377
39	63B	Light Wheel Vehicle	0.82377
40	68H	Aircraft Pneudraulic	0.82377
41	71G	Patient Administration	0.82377
42	76Y	Unit Supply Specialist	0.82377
43	96H	Aerial Intelligence	0.82377
44	45G	Fire Control Systems	0.72871
45	71L	Administrative Spec	0.72871
46	71M	Chaplain Assistant	0.72871
47	74D	Computer/Machine Oper	0.72871
48	76P	Material Control	0.72871
49	98C	EW/Signal Intelligent	0.72871
50	98J	EW/Signal Intelligence	0.72871
51	91P	Xray Specialist	0.65749
52	41C	Fire Control Instrum	0.63366
53	45B	Small Arms Repairer	0.63366
54	45D	Self-Propelled FA Tu	0.63366

Table A.6—continued

Rank	MOS	Title	Score
55	45E	M1 Abrams Tank Turret	0.63366
56	62B	Construction Equipment	0.63366
57	76J	Medical Supply Spec	0.63366
58	93F	FA Meteorological Crew	0.63366
59	13E	Cannon Fire Direction	0.53860
60	19K	M1 Armor Crewman	0.53860
61	31V	Unit-Level Communicat	0.53860
62	43E	Parachute Rigger	0.53860
63	67N	Utility Helicopter	0.53860
64	72E	Tactical Telecommun	0.53860
65	83E	Photo & Layout Spec	0.53860
66	83F	Printing & Bindery	0.53860
67	91J	Physical Therapy Spec	0.53860
68	13C	Tacfire Operations	0.44354
69	13F	Fire Support Spec	0.44354
70	35G	Biomedical Equipment	0.44354
71	73C	Finance Specialist	0.44354
72	73D	Accounting Specialist	0.44354
73	75D	Personnel Records Spec	0.44354
74	76X	Subsistence Supply	0.44354
75	94B	Food Service Spec	0.44354
76	91S	Preventive Medicine	0.37231
77	91Y	Eye Specialist	0.37231
78	11C	Indirect Fire Infant	0.34848
79	11H	Heavy Antiarmor Weap	0.34848
80	19D	Cavalry Scout	0.34848
81	21G	Pershing Electronics	0.34848
82	29N	Telephone Central Off	0.34848
83	63J	Quartermaster & Chem	0.34848
84	75E	Personnel Actions Spec	0.34848
85	75F	Personnel Information	0.34848
86	76C	Equipment Records	0.34848
87	91D	Operating Room Spec	0.27726
88	91G	Behavioral Science	0.27726
89	91R	Veterinary Food Insp	0.27726
90	12F	Engineer Tracked Veh	0.25343
91	27B	Land Combat Support	0.25343
92	27E	TOW/Dragon Repairer	0.25343
93	27F	Vulcan Repairer	0.25343
94	27G	Chaparral/Redeye Rep	0.25343
95	31D	MSE Transmission Sys	0.25343
96	45K	Tank Turret Repairer	0.25343
97	46N	Pershing Electrical	0.25343
98	51G	Materials Quality Spec	0.25343
99	52D	Power-Generation Equ	0.25343
100	52F	Turbine Engine Drive	0.25343
101	67H	Observation Airplane	0.25343
102	72G	Automatic Data Telect	0.25343
103	75B	Personnel Administrat	0.25343
104	75C	Personnel Management	0.25343
105	76V	Material Storage	0.25343
106	81B	Technical Drafting	0.25343
107	96B	Intelligence Analyst	0.25343
108	91F	Psychiatric Specialist	0.18220
109	91N	Cardiac Specialist	0.18220
110	00B	Diver	0.15837
111	11B	Infantryman	0.15837

Table A.6—continued

Rank	MOS	Title	Score
112	13B	Cannon Crewman	0.15837
113	15E	Pershing Missile Rep	0.15837
114	24M	Vulcan System Mechanic	0.15837
115	57F	Graves Registration	0.15837
116	82C	FA Surveyor	0.15837
117	74F	Programmer/Analyst	0.08714
118	91A	Medical Specialist	0.08714
119	91L	Occupational Therapy	0.08714
120	19E	M60 Armor Crewman	0.06331
121	12B	Combat Engineer	–0.03175
122	12C	Bridge Crewman	–0.03175
123	16T	PATRIOT Missile Crew	–0.03175
124	24N	Chaparral System Mec	–0.03175
125	27L	LANCE System Repair	–0.03175
126	27M	MLRS Repairer	–0.03175
127	27N	Forward Area Alerting	–0.03175
128	31L	Wire Systems Install	–0.03175
129	31M	Multichannel Commo	–0.03175
130	31N	Commo Systems/Circuit	–0.03175
131	33P	EW/Intercept Strateg	–0.03175
132	33Q	EW/Intercept Strateg	–0.03175
133	33R	EW/Intercept Aviation	–0.03175
134	33T	EW/Intercept Tactical	–0.03175
135	33V	EW/Intercept Aerial	–0.03175
136	43M	Fabric Repair Spec	–0.03175
137	51B	Carpentry & Masonry	–0.03175
138	51K	Plumber	–0.03175
139	51R	Interior Electrician	–0.03175
140	55B	Ammunition Specialist	–0.03175
141	55D	Explosive Ordnance	–0.03175
142	55G	Nuclear Weapons Spec	–0.03175
143	55R	Ammunition Stock Con	–0.03175
144	57E	Laundry & Bath Spec	–0.03175
145	62E	Heavy Construction	–0.03175
146	62F	Crane Operator	–0.03175
147	62G	Quarrying Specialist	–0.03175
148	62H	Concrete & Asphalt	–0.03175
149	62J	General Construction	–0.03175
150	63D	Self-Propelled FA Sys	–0.03175
151	63G	Fuel & Electrical Sys	–0.03175
152	63H	Track Vehicle Repair	–0.03175
153	63N	M60A1/A3 Tank System	–0.03175
154	63S	Heavy Wheel Vehicle	–0.03175
155	63T	Bradley Fighting Veh	–0.03175
156	63W	Wheel Vehicle Repair	–0.03175
157	63Y	Track Vehicle Mechan	–0.03175
158	88H	Cargo Specialist	–0.03175
159	88K	Watercraft Operator	–0.03175
160	88L	Watercraft Engineer	–0.03175
161	88M	Motor Transport Oper	–0.03175
162	02X	Bandsman	–0.29309
163	29M	Tactical Satellite/M	–0.29309
164	29V	Strategic Microwave	–0.29309
165	39E	Special Electronics	–0.29309
166	67R	AH-64 Attack Helicop	–0.29309
167	67S	Scout Helicopter Rep	–0.29309
168	67U	Medium Helicopter Rep	–0.29309

Table A.6—continued

Rank	MOS	Title	Score
169	67V	Observation/Scout He	–0.29309
170	91Q	Pharmacy Specialist	–0.29309
171	91U	Ear Nose & Throat Sp	–0.29309
172	29E	Radio Repairer	–0.38815
173	39D	Decentralized Svc	–0.38815
174	29Y	SATCOM Systems Repair	–0.48321
175	36L	Transportable Automat	–0.48321
176	39Y	FA Tactical Fire Dir	–0.48321
177	67Y	AH-1 Attack Helicopt	–0.48321
178	98G	EW/Signal Intelligence	–0.48321
179	13R	FA Firefinder Radar	–0.57826
180	29J	Teletypewriter Equip	–0.57826
181	39C	Target Acquisition/S	–0.57826
182	29F	Fixed Communications	–0.67332
183	29S	Field Commo Security	–0.67332
184	31Q	Tactical Satellite/M	–0.67332
185	51M	Fire Fighter	–0.67332
186	93D	Air Traffic Control	–0.67332
187	11M	Fighting Vehicle Inf	–0.76838
188	67T	Tactical Transport	–0.76838
189	68J	Aircraft Armament/Mi	–0.76838
190	82B	Construction Surveyor	–0.76838
191	95B	Military Police	–0.76838
192	16J	Defense Acquisition	–0.86344
193	63E	M1 Abrams Tank Syst	–0.86344
194	88N	Traffic Management	–0.95849
195	01H	Biological Sciences	–1.05355
196	13M	Multiple Launch Rock	–1.05355
197	13N	LANCE Crewmember	–1.05355
198	13P	MLRS/LANCE Operation	–1.05355
199	16D	Hawk Missile Crewmem	–1.05355
200	16E	Hawk Fire Control Crew	–1.05355
201	16P	Chaparral Crewmember	–1.05355
202	16R	Vulcan Crewmember	–1.05355
203	16S	MANPADS/STINGER Crew	–1.05355
204	23R	Hawk Missile System	–1.05355
205	25P	Visual Info/Audio Do	–1.05355
206	25Q	Graphics Documentation	–1.05355
207	25R	Visual Info/Audio Equ	–1.05355
208	25S	Still Documentation	–1.05355
209	27H	Hawk Firing Section	–1.05355
210	27J	Hawk Field Maint Equ	–1.05355
211	27K	Hawk Fire Control Co	–1.05355
212	27T	Pedestal Mounted Sti	–1.05355
213	31C	Single-Channel Radio	–1.05355
214	31F	MSE Network Switching	–1.05355
215	31K	Combat Signaler	–1.05355
216	36M	Switching Systems Op	–1.05355
217	39B	Automatic Test Equip	–1.05355
218	39G	Automated Communicat	–1.05355
219	39L	FA Digital Systems	–1.05355
220	45T	Bradley Fighting Veh	–1.05355
221	46Q	Journalist	–1.05355
222	46R	Broadcast Journalist	–1.05355
223	54B	Chemical Operations	–1.05355
224	68L	Avionic Communication	–1.05355
225	68N	Avionic Mechanic	–1.05355

Table A.6—continued

Rank	MOS	Title	Score
226	68Q	Avionic Flight System	–1.05355
227	68R	Avionic Radar Repair	–1.05355
228	77F	Petroleum Supply Spec	–1.05355
229	77L	Petroleum Laboratory	–1.05355
230	77W	Water Treatment Spec	–1.05355
231	81Q	Terrain Analyst	–1.05355
232	91H	Orthopedic Specialist	–1.05355
233	91X	Health Physics Spec	–1.05355
234	92E	Cytology Specialist	–1.05355
235	93B	Aeroscout Specialist	–1.05355
236	95D	CID Special Agent	–1.05355
237	96F	Psychological Operat	–1.05355
238	96R	Ground Surveillance	–1.05355
239	97B	Counterintelligence	–1.05355
240	98D	Emitter Locator Iden	–1.05355
241	98H	Morse Interceptor	–1.05355
242	98K	Non-Morse Interceptor	–1.05355

Table A.7

MOS Ranked on Factor 7, Size and Specialization

Rank	MOS	Title	Score
1	11B	Infantryman	8.46195
2	95B	Military Police	3.75963
3	19D	Cavalry Scout	2.97851
4	91A	Medical Specialist	2.82166
5	13B	Cannon Crewman	2.05040
6	11M	Fighting Vehicle Inf	2.01883
7	31C	Single-Channel Radio	2.00934
8	88M	Motor Transport Oper	1.73346
9	76Y	Unit Supply Specialist	1.70264
10	31L	Wire Systems Install	1.58836
11	76P	Material Control	1.50128
12	94B	Food Service Special	1.34211
13	11C	Indirect Fire Infant	1.15798
14	63B	Light Wheel Vehicle	1.09968
15	98G	EW/Signal Intelligence	1.05926
16	97B	Counterintelligence	1.02415
17	19K	M1 Armor Crewman	1.01213
18	29E	Radio Repairer	0.99248
19	12B	Combat Engineer	0.95177
20	98J	EW/Signal Intelligence	0.94871
21	31M	Multichannel Commo	0.94563
22	29Y	SATCOM Systems Repair	0.90540
23	68D	Aircraft Powertrain	0.88771
24	29F	Fixed Communications	0.86442
25	52E	Prime Power Production	0.83508
26	63H	Track Vehicle Repair	0.79243
27	13F	Fire Support Spec	0.76420
28	19E	M60 Armor Crewman	0.75098
29	52D	Power-Generation Equ	0.70320
30	31Q	Tactical Satellite/M	0.70022
31	43E	Parachute Rigger	0.68905
32	54B	Chemical Operations	0.67526
33	71L	Administrative Speci	0.66967
34	76V	Material Storage	0.65524
35	98K	Non-Morse Interceptor	0.65272
36	11H	Heavy Antiarmor Weap	0.62310
37	67U	Medium Helicopter Rep	0.61314
38	68J	Aircraft Armament/Mi	0.61221
39	96D	Imagery Analyst	0.55121
40	98C	EW/Signal Intelligence	0.55046
41	75B	Personnel Administrat	0.54813
42	68N	Avionic Mechanic	0.53304
43	68F	Aircraft Electrician	0.52746
44	76J	Medical Supply Spec	0.51162
45	76C	Equipment Records	0.51013
46	72E	Tactical Telecommuni	0.50249
47	31F	MSE Network Switching	0.49160
48	67H	Observation Airplane	0.48461
49	63T	Bradley Fighting Veh	0.44848
50	67T	Tactical Transport	0.41215
51	77F	Petroleum Supply Spec	0.39790
52	72G	Automatic Data Telect	0.38281
53	67N	Utility Helicopter	0.31250
54	67Y	AH-1 Attack Helicopt	0.29340

Table A.7—continued

Rank	MOS	Title	Score
55	63W	Wheel Vehicle Repair	0.28241
56	67R	AH-64 Attack Helicop	0.27059
57	27E	TOW/Dragon Repairer	0.26966
58	63S	Heavy Wheel Vehicle	0.24842
59	29M	Tactical Satellite/M	0.22588
60	67V	Observation/Scout He	0.21843
61	93P	Aviations Operations	0.21703
62	16S	MANPADS/STINGER Crew	0.21349
63	36M	Switching Systems Ope	0.21145
64	45K	Tank Turret Repairer	0.20539
65	74D	Computer/Machine Ope	0.20306
66	13R	FA Firefinder Radar	0.19561
67	75C	Personnel Management	0.19375
68	29S	Field Commo Security	0.19002
69	68R	Avionic Radar Repair	0.18350
70	63N	M60A1/A3 Tank System	0.18118
71	36L	Transportable Automat	0.17605
72	39B	Automatic Test Equip	0.15743
73	88N	Traffic Management	0.15463
74	93F	FA Meteorological Cr	0.15091
75	68B	Aircraft Powerplant	0.13880
76	67S	Scout Helicopter Rep	0.12762
77	33V	EW/Intercept Aerial	0.12669
78	29V	Strategic Microwave	0.12343
79	68H	Aircraft Pneudraulic	0.12343
80	39G	Automated Communicat	0.11645
81	31K	Combat Signaler	0.11216
82	96B	Intelligence Analyst	0.03141
83	63E	M1 Abrams Tank System	0.02676
84	55B	Ammunition Specialist	0.02303
85	16R	Vulcan Crewmember	0.02257
86	13M	Multiple Launch Rock	0.01791
87	88H	Cargo Specialist	–0.00165
88	93C	Air Traffic Control	–0.01935
89	97E	Interrogator	–0.04542
90	62J	General Construction	–0.05381
91	12C	Bridge Crewman	–0.05939
92	91C	Practical Nurse	–0.06452
93	92B	Medical Laboratory	–0.06638
94	63Y	Track Vehicle Mechan	–0.07336
95	16P	Chaparral Crewmember	–0.08128
96	02X	Bandsman	–0.08407
97	13N	LANCE Crewmember	–0.09572
98	63D	Self-Propelled FA Sys	–0.11248
99	76X	Subsistence Supply	–0.12925
100	29J	Teletypewriter Equip	–0.14368
101	31V	Unit-Level Communicat	–0.14722
102	75E	Personnel Actions Spec	–0.15020
103	75F	Personnel Information	–0.16091
104	74F	Programmer/Analyst	–0.16138
105	13P	MLRS/LANCE Operation	–0.16371
106	68G	Aircraft Structural	–0.17395
107	33T	EW/Intercept Tactical	–0.17535
108	33P	EW/Intercept Strateg	–0.18513
109	55D	Explosive Ordnance	–0.18606
110	55R	Ammunition Stock Con	–0.18839
111	29N	Telephone Central Off	–0.19025

Table A.7—continued

Rank	MOS	Title	Score
112	33Q	EW/Intercept Strateg	–0.19071
113	88K	Watercraft Operator	–0.19444
114	24M	Vulcan System Mechan	–0.19491
115	35H	TMDE Maintenance Sup	–0.19723
116	31D	MSE Transmission Sys	–0.19817
117	63G	Fuel & Electrical Sys	–0.19863
118	95D	CID Special Agent	–0.20003
119	46Q	Journalist	–0.20049
120	91Q	Pharmacy Specialist	–0.20143
121	97G	Counter-Signals Intel	–0.20236
122	39C	Target Acquisition/S	–0.20748
123	41C	Fire Control Instrum	–0.21493
124	75D	Personnel Records Spe	–0.21540
125	83F	Printing & Bindery	–0.21633
126	88L	Watercraft Engineer	–0.22517
127	45G	Fire Control Systems	–0.22611
128	25S	Still Documentation	–0.22657
129	24N	Chaparral System Mech	–0.22750
130	24C	Hawk Firing Section	–0.22937
131	45N	M60A1/A3 Tank Turret	–0.23076
132	82D	Topographic Surveyor	–0.23775
133	77L	Petroleum Laboratory	–0.23821
134	24H	Hawk Fire Control Rep	–0.24008
135	91N	Cardiac Specialist	–0.24008
136	16T	PATRIOT Missile Crew	–0.27808
137	13E	Cannon Fire Direction	–0.29857
138	62E	Heavy Construction	–0.35864
139	98H	Morse Interceptor	–0.37587
140	82C	FA Surveyor	–0.38798
141	15E	Pershing Missile Rep	–0.41499
142	62B	Construction Equipment	–0.42057
143	52C	Utilities Equipment	–0.42942
144	63J	Quartermaster & Chem	–0.44246
145	71D	Legal Specialist	–0.44339
146	93B	Aeroscout Specialist	–0.45643
147	96R	Ground Surveillance	–0.46295
148	31N	Commo Systems/Circuit	–0.46481
149	24T	PATRIOT Operator	–0.47087
150	16D	Hawk Missile Crewmem	–0.47366
151	73C	Finance Specialist	–0.48065
152	71M	Chaplain Assistant	–0.48437
153	51B	Carpentry & Masonry	–0.48484
154	44B	Metal Worker	–0.48763
155	91E	Dental Specialist	–0.48949
156	12F	Engineer Tracked Veh	–0.49136
157	45T	Bradley Fighting Veh	–0.49695
158	91D	Operating Room Spec	–0.50114
159	98D	Emitter Locator Iden	–0.50719
160	45E	M1 Abrams Tank Turret	–0.50905
161	81Q	Terrain Analyst	–0.51464
162	62F	Crane Operator	–0.51557
163	35G	Biomedical Equipment	–0.51650
164	71G	Patient Administration	–0.51650
165	94F	Hospital Food Service	–0.52070
166	52F	Turbine Engine Drive	–0.52489
167	39E	Special Electronics	–0.52815
168	91S	Preventive Medicine	–0.53513

Table A.7—continued

Rank	MOS	Title	Score
169	91R	Veterinary Food Insp	–0.53839
170	13C	Tacfire Operations	–0.53932
171	91G	Behavioral Science	–0.54584
172	55G	Nuclear Weapons Spec	–0.54631
173	45B	Small Arms Repairer	–0.54817
174	45D	Self-Propelled FA Tu	–0.55283
175	16E	Hawk Fire Control Cr	–0.55329
176	68L	Avionic Communication	–0.55329
177	25R	Visual Info/Audio Equ	–0.55609
178	39D	Decentralized Svc	–0.55609
179	96F	Psychological Operat	–0.55842
180	57E	Laundry & Bath Speci	–0.55888
181	27F	Vulcan Repairer	–0.55981
182	45L	Artillery Repairer	–0.55981
183	33R	EW/Intercept Aviation	–0.56028
184	91J	Physical Therapy Spec	–0.56028
185	27M	MLRS Repairer	–0.56074
186	91P	Xray Specialist	–0.56121
187	73D	Accounting Specialist	–0.56400
188	91T	Animal Care Specialist	–0.56540
189	46R	Broadcast Journalist	–0.56633
190	25Q	Graphics Documentation	–0.56680
191	46N	Pershing Electrical	–0.56726
192	27G	Chaparral/Redeye Rep	–0.56819
193	68Q	Avionic Flight Syste	–0.56819
194	21G	Pershing Electronics	–0.56913
195	21L	Pershing Electronics Rep	–0.56959
196	91F	Psychiatric Specialist	–0.57145
197	16J	Defense Acquisition	–0.57192
198	25P	Visual Info/Audio Do	–0.57192
199	57F	Graves Registration	–0.57285
200	77W	Water Treatment Spec	–0.57332
201	24K	Hawk Continuous Wave	–0.57565
202	27B	Land Combat Support	–0.57611
203	27N	Forward Area Alerting	–0.57890
204	91Y	Eye Specialist	–0.57937
205	51R	Interior Electrician	–0.58077
206	25L	AN/TSQ 73 Ada Com	–0.58123
207	71C	Executive Administra	–0.58356
208	82B	Construction Surveyor	–0.58356
209	91H	Orthopedic Specialist	–0.58356
210	24G	Hawk Information Coor	–0.58403
211	43M	Fabric Repair Spec	–0.58496
212	62H	Concrete & Asphalt	–0.58542
213	27J	Hawk Field Maint Equ	–0.58636
214	83E	Photo & Layout Spec	–0.58636
215	96H	Aerial Intelligence	–0.58636
216	51K	Plumber	–0.58682
217	42D	Dental Laboratory Spec	–0.58822
218	00B	Diver	–0.58962
219	39L	FA Digital Systems	–0.58962
220	44E	Machinist	–0.58962
221	27H	Hawk Firing Section	–0.59148
222	91U	Ear Nose & Throat Spec	–0.59241
223	93D	Air Traffic Control	–0.59241
224	27L	LANCE System Repairer	–0.59427
225	42E	Optical Laboratory	–0.59427

Table A.7—continued

Rank	MOS	Title	Score
226	39Y	FA Tactical Fire Dir	–0.59520
227	71E	Court Reporter	–0.59567
228	91V	Respiratory Specialist	–0.59613
229	51M	Fire Fighter	–0.59660
230	81B	Technical Drafting	–0.59707
231	91L	Occupational Therapy	–0.59707
232	51G	Materials Quality Spec	–0.60033
233	81C	Cartographer	–0.60033
234	62G	Quarrying Specialist	–0.60079
235	91X	Health Physics Spec	–0.60172
236	92E	Cytology Specialist	–0.60172
237	42C	Orthotic Specialist	–0.60359
238	01H	Biological Sciences	–0.60685
239	23R	Hawk Missile System	–0.60685
240	27K	Hawk Fire Control Coor	–0.60685
241	27T	Pedestal Mounted Sti	–0.60685
242	91W	Nuclear Medicine Spec	–0.60685

Appendix B
COST AND THROUGHPUT RANKINGS OF MOS

Table B.1

Rankings of MOS by Cost per Graduate in FY89

Rank	MOS	Title	Total Cost per Capita
1	29N	Telephone Central Of	$149,424
2	24G	Hawk Information Coor	$91,150
3	24H	Hawk Fire Control Re	$71,306
4	24T	PATRIOT Operator	$55,890
5	21L	Pershing Electronics	$54,629
6	33P	EW/Intercept Strateg	$53,636
7	33Q	EW/Intercept Strateg	$52,737
8	27F	Vulcan Repairer	$49,744
9	33T	EW/Intercept Tactical	$48,731
10	27B	Land Combat Support	$48,466
11	24K	Hawk Continuous Wave	$42,893
12	24C	Hawk Firing Section	$41,706
13	25L	AN/TSQ 73 Ada Com	$40,457
14	27G	Chaparral/Redeye Rep	$40,421
15	29E	Radio Repairer	$40,395
16	33R	EW/Intercept Aviation	$40,249
17	29V	Strategic Microwave	$39,206
18	39E	Special Electronics	$38,160
19	36L	Transportable Automat	$38,081
20	98D	Emitter Locator Iden	$37,981
21	93D	Air Traffic Control	$37,151
22	27N	Forward Area Alerting	$37,119
23	29M	Tactical Satellite/M	$34,281
24	45G	Fire Control Systems	$32,660
25	24M	Vulcan System Mechan	$31,960
26	39D	Decentralized Svc Su	$31,707
27	98G	EW/Signal Intelligence	$31,367
28	39B	Automatic Test Equip	$30,177
29	33V	EW/Intercept Aerial	$30,176
30	71M	Chaplain Assistant	$29,121
31	42D	Dental Laboratory Spec	$28,025
32	27E	TOW/Dragon Repairer	$27,458
33	98H	Morse Interceptor	$27,173
34	42C	Orthotic Specialist	$27,132
35	45K	Tank Turret Repairer	$26,855
36	01H	Biological Sciences	$26,043
37	02X	Bandsman	$26,043
38	27K	Hawk Fire Control Co	$26,043
39	31D	MSE Transmission Sys	$26,043
40	31F	MSE Network Switching	$26,043
41	35G	Biomedical Equipment	$26,043
42	35H	TMDE Maintenance Sup	$26,043
43	39C	Target Acquisition/S	$26,043
44	39L	FA Digital Systems	$26,043
45	39Y	FA Tactical Fire Dir	$26,043
46	42E	Optical Laboratory	$26,043
47	46Q	Journalist	$26,043
48	46R	Broadcast Journalist	$26,043

Table B.1—continued

Rank	MOS	Title	Total Cost per Capita
49	51M	Fire Fighter	$26,043
50	52E	Prime Power Production	$26,043
51	67H	Observation Airplane	$26,043
52	67N	Utility Helicopter	$26,043
53	67R	AH-64 Attack Helicop	$26,043
54	67S	Scout Helicopter Rep	$26,043
55	67T	Tactical Transport	$26,043
56	67U	Medium Helicopter Re	$26,043
57	67V	Observation/Scout He	$26,043
58	67Y	AH-1 Attack Helicopt	$26,043
59	68B	Aircraft Powerplant	$26,043
60	68D	Aircraft Powertrain	$26,043
61	68F	Aircraft Electrician	$26,043
62	68G	Aircraft Structural	$26,043
63	68H	Aircraft Pneudraulic	$26,043
64	68J	Aircraft Armament/Mi	$26,043
65	68L	Avionic Communication	$26,043
66	68N	Avionic Mechanic	$26,043
67	68Q	Avionic Flight System	$26,043
68	68R	Avionic Radar Repair	$26,043
69	71E	Court Reporter	$26,043
70	81B	Technical Drafting	$26,043
71	81C	Cartographer	$26,043
72	81Q	Terrain Analyst	$26,043
73	82B	Construction Surveyor	$26,043
74	82D	Topographic Surveyor	$26,043
75	83E	Photo & Layout Spec	$26,043
76	83F	Printing & Bindery	$26,043
77	88H	Cargo Specialist	$26,043
78	88K	Watercraft Operator	$26,043
79	88L	Watercraft Engineer	$26,043
80	88M	Motor Transport Oper	$26,043
81	88N	Traffic Management	$26,043
82	91C	Practical Nurse	$26,043
83	91T	Animal Care Specialist	$26,043
84	91W	Nuclear Medicine Spec	$26,043
85	92E	Cytology Specialist	$26,043
86	93B	Aeroscout Specialist	$26,043
87	93C	Air Traffic Control	$26,043
88	93F	FA Meteorological Crew	$26,043
89	93P	Aviations Operations	$26,043
90	97G	Counter-Signals Intel	$26,043
91	98C	EW/Signal Intelligence	$26,043
92	98K	Non-Morse Interceptor	$26,043
93	00B	Diver	$26,043
94	74F	Programmer/Analyst	$26,043
95	91X	Health Physics Spec	$26,043
96	95D	CID Special Agent	$26,043
97	29F	Fixed Communications	$25,490
98	27H	Hawk Firing Section	$25,043
99	63G	Fuel & Electrical Sys	$24,736
100	77L	Petroleum Laboratory	$24,388
101	98J	EW/Signal Intelligence	$23,828
102	29J	Teletypewriter Equip	$23,443
103	45T	Bradley Fighting Veh	$23,417
104	46N	Pershing Electrical	$23,283

Table B.1—continued

Rank	MOS	Title	Total Cost per Capita
105	44B	Metal Worker	$22,990
106	21G	Pershing Electronics	$22,807
107	23R	Hawk Missile System	$22,735
108	25P	Visual Info/Audio Do	$22,735
109	25Q	Graphics Documentation	$22,735
110	25R	Visual Info/Audio Equ	$22,735
111	25S	Still Documentation	$22,735
112	27J	Hawk Field Maint Equ	$22,735
113	27T	Pedestal Mounted Sti	$22,735
114	39G	Automated Communicat	$22,735
115	55G	Nuclear Weapons Spec	$22,492
116	63H	Track Vehicle Repair	$22,121
117	29Y	SATCOM Systems Repair	$21,792
118	41C	Fire Control Instrum	$21,048
119	45N	M60A1/A3 Tank Turret	$20,877
120	63W	Wheel Vehicle Repair	$20,736
121	54B	Chemical Operations	$20,470
122	63T	Bradley Fighting Veh	$20,345
123	31M	Multichannel Commo	$20,312
124	45E	M1 Abrams Tank Turret	$20,308
125	92B	Medical Laboratory	$20,245
126	27M	MLRS Repairer	$20,187
127	44E	Machinist	$20,047
128	95B	Military Police	$20,043
129	63E	M1 Abrams Tank Sys	$20,040
130	29S	Field Commo Security	$19,750
131	72G	Automatic Data Telect	$19,650
132	71C	Executive Administrat	$19,614
133	12F	Engineer Tracked Veh	$19,546
134	96F	Psychological Operat	$19,455
135	96D	Imagery Analyst	$19,413
136	51G	Materials Quality Spec	$19,386
137	63Y	Track Vehicle Mechanic	$19,284
138	91Q	Pharmacy Specialist	$19,233
139	91G	Behavioral Science	$18,957
140	45L	Artillery Repairer	$18,895
141	63N	M60A1/A3 Tank System	$18,709
142	31C	Single-Channel Radio	$18,547
143	91L	Occupational Therapy	$18,293
144	55D	Explosive Ordnance	$18,292
145	91S	Preventive Medicine	$18,241
146	31N	Commo Systems/Circuit	$18,173
147	16T	PATRIOT Missile Crew	$18,100
148	13F	Fire Support Special	$17,724
149	91J	Physical Therapy Spec	$17,631
150	91V	Respiratory Specialist	$17,515
151	27L	LANCE System Repaire	$17,391
152	63J	Quartermaster & Chem	$17,330
153	52C	Utilities Equipment	$17,164
154	91P	Xray Specialist	$17,029
155	96H	Aerial Intelligence	$16,998
156	72E	Tactical Telecommun	$16,878
157	43E	Parachute Rigger	$16,791
158	31Q	Tactical Satellite/M	$16,653
159	15E	Pershing Missile Crew	$16,539
160	71D	Legal Specialist	$16,289

Table B.1—continued

Rank	MOS	Title	Total Cost per Capita
161	13R	FA Firefinder Radar	$16,254
162	75C	Personnel Management	$16,226
163	52F	Turbine Engine Driver	$15,983
164	73D	Accounting Specialist	$15,973
165	97B	Counterintelligence	$15,942
166	74D	Computer/Machine Ope	$15,851
167	75F	Personnel Information	$15,662
168	51B	Carpentry & Masonry	$15,410
169	82C	FA Surveyor	$15,408
170	45B	Small Arms Repairer	$15,308
171	77W	Water Treatment Spec	$15,286
172	24N	Chaparral System Mech	$15,147
173	97E	Interrogator	$15,118
174	13N	LANCE Crewmember	$15,101
175	13P	MLRS/LANCE Operation	$15,101
176	31V	Unit-Level Communicat	$15,091
177	77F	Petroleum Supply Spec	$15,021
178	16E	Hawk Fire Control Crew	$14,857
179	31K	Combat Signaler	$14,770
180	57F	Graves Registration	$14,756
181	52D	Power-Generation Equ	$14,592
182	31L	Wire Systems Instal	$14,484
183	16P	Chaparral Crewmember	$14,421
184	73C	Finance Specialist	$14,322
185	36M	Switching Systems Oper	$14,259
186	13M	Multiple Launch Rocket	$14,234
187	16D	Hawk Missile Crewmem	$14,229
188	16J	Defense Acquisition	$14,037
189	45D	Self-Propelled FA	$13,882
190	75B	Personnel Administrat	$13,828
191	96B	Intelligence Analyst	$13,615
192	91A	Medical Specialist	$13,502
193	16S	MANPADS/STINGER Crew	$13,435
194	94B	Food Service Specialist	$13,410
195	43M	Fabric Repair Spec	$13,393
196	16R	Vulcan Crewmember	$13,390
197	91R	Veterinary Food Insp	$13,311
198	76C	Equipment Records	$13,231
199	63B	Light Wheel Vehicle	$13,207
200	55B	Ammunition Specialist	$12,497
201	96R	Ground Surveillance	$12,382
202	63D	Self-Propelled FA	$12,177
203	57E	Laundry & Bath Spec	$11,962
204	71L	Administrative Spec	$11,954
205	71G	Patient Administration	$11,865
206	13E	Cannon Fire Direction	$11,848
207	63S	Heavy Wheel Vehicle	$11,668
208	76V	Material Storage	$11,548
209	76P	Material Control	$11,291
210	76X	Subsistence Supply	$11,200
211	91F	Psychiatric Specialist	$11,192
212	76Y	Unit Supply Specialist	$11,141
213	13C	Tacfire Operations	$11,120
214	55R	Ammunition Stock Con	$10,989
215	91H	Orthopedic Specialist	$10,756
216	91D	Operating Room Spec	$10,742

Table B.1—continued

Rank	MOS	Title	Total Cost per Capita
217	75E	Personnel Actions Spec	$10,719
218	13B	Cannon Crewman	$10,657
219	94F	Hospital Food Service	$10,644
220	91Y	Eye Specialist	$10,324
221	91U	Ear Nose & Throat Spec	$10,241
222	75D	Personnel Records Spec	$10,238
223	91E	Dental Specialist	$10,229
224	76J	Medical Supply Spec	$9,467
225	11M	Fighting Vehicle Inf	$9,118
226	19D	Cavalry Scout	$9,101
227	19E	M60 Armor Crewman	$9,101
228	62G	Quarrying Specialist	$8,944
229	11B	Infantryman	$8,767
230	91N	Cardiac Specialist	$8,726
231	62F	Crane Operator	$8,619
232	12C	Bridge Crewman	$8,616
233	62E	Heavy Construction	$8,596
234	12B	Combat Engineer	$8,575
235	51K	Plumber	$8,535
236	19K	M1 Armor Crewman	$8,504
237	51R	Interior Electrician	$8,468
238	62H	Concrete & Asphalt	$8,436
239	62J	General Construction	$8,414
240	11C	Indirect Fire Infant	$8,357
241	11H	Heavy Antiarmor Weapon	$8,332
242	62B	Construction Equipment	$8,320

Table B.2

Rankings of MOS by Number of Graduates in FY89

Rank	MOS	Title	No. of Grads in FY89
1	11B	Infantryman	11326
2	95B	Military Police	4161
3	13B	Cannon Crewman	3966
4	91A	Medical Specialist	3962
5	88M	Motor Transport Oper	3764
6	12B	Combat Engineer	2979
7	63B	Light Wheel Vehicle	2534
8	19K	M1 Armor Crewman	2440
9	94B	Food Service Specialist	2370
10	11M	Fighting Vehicle Inf	2344
11	19D	Cavalry Scout	2012
12	76Y	Unit Supply Specialist	1766
13	31C	Single-Channel Radio	1581
14	31K	Combat Signaler	1408
15	11C	Indirect Fire Infant	1403
16	76C	Equipment Records	1396
17	13F	Fire Support Special	1329
18	77F	Petroleum Supply Spec	1217
19	52D	Power-Generation Equ	1156
20	98G	EW/Signal Intelligen	1131
21	54B	Chemical Operations	1124
22	71L	Administrative Spec	1115
23	76V	Material Storage	1064
24	63W	Wheel Vehicle Repairer	1054
25	11H	Heavy Antiarmor Weapon	1043
26	63S	Heavy Wheel Vehicle	977
27	16S	MANPADS/STINGER Crewman	956
28	31V	Unit-Level Communicat	919
29	31M	Multichannel Commo	906
30	75B	Personnel Administrat	884
31	72E	Tactical Telecommun	792
32	31L	Wire Systems Install	783
33	98C	EW/Signal Intelligence	750
34	76P	Material Control	651
35	63T	Bradley Fighting Veh	649
36	13E	Cannon Fire Direction	642
37	63H	Track Vehicle Repairer	632
38	67T	Tactical Transport	605
39	16T	PATRIOT Missile Crewman	577
40	19E	M60 Armor Crewman	557
41	13M	Multiple Launch Rock	548
42	55B	Ammunition Specialist	541
43	16R	Vulcan Crewmember	534
44	72G	Automatic Data Telect	525
45	63E	M1 Abrams Tank System	515
46	62E	Heavy Construction	496
47	98H	Morse Interceptor	496
48	88H	Cargo Specialist	492
49	93C	Air Traffic Control	481
50	96B	Intelligence Analyst	453
51	31Q	Tactical Satellite/M	446
52	67N	Utility Helicopter	430
53	82C	FA Surveyor	411

Table B.2—continued

Rank	MOS	Title	No. of Grads in FY89
54	98K	Non-Morse Interceptor	408
55	62J	General Construction	393
56	67Y	AH-1 Attack Helicopter	382
57	97E	Interrogator	376
58	12C	Bridge Crewman	361
59	62B	Construction Equipment	357
60	02X	Bandsman	357
61	52C	Utilities Equipment	355
62	63Y	Track Vehicle Mechanic	354
63	91C	Practical Nurse	351
64	92B	Medical Laboratory	349
65	15E	Pershing Missile Crew	343
66	67R	AH-64 Attack Helicopter	335
67	16P	Chaparral Crewmember	335
68	63J	Quartermaster & Chem	328
69	29E	Radio Repairer	318
70	71D	Legal Specialist	317
71	93B	Aeroscout Specialist	313
72	97B	Counterintelligence	310
73	13N	LANCE Crewmember	306
74	67U	Medium Helicopter Rep	304
75	27E	TOW/Dragon Repairer	297
76	43E	Parachute Rigger	294
77	63D	Self-Propelled FA Sys	276
78	68J	Aircraft Armament/Mi	271
79	31N	Commo Systems/Circuit	266
80	96R	Ground Surveillance	264
81	16D	Hawk Missile Crewmember	261
82	76X	Subsistence Supply	245
83	51B	Carpentry & Masonry	244
84	98J	EW/Signal Intelligence	240
85	44B	Metal Worker	236
86	71M	Chaplain Assistant	232
87	67V	Observation/Scout He	231
88	73C	Finance Specialist	229
89	93P	Aviations Operations	228
90	91E	Dental Specialist	227
91	24T	PATRIOT Operator	215
92	12F	Engineer Tracked Veh	214
93	98D	Emitter Locator Ident	214
94	91D	Operating Room Spec	213
95	45T	Bradley Fighting Veh	211
96	36M	Switching Systems Op	202
97	75E	Personnel Actions Spec	198
98	45K	Tank Turret Repairer	194
99	29J	Teletypewriter Equip	189
100	45E	M1 Abrams Tank Turret	188
101	71G	Patient Administrat	184
102	74D	Computer/Machine Oper	182
103	62F	Crane Operator	181
104	75F	Personnel Information	181
105	29M	Tactical Satellite/M	179
106	81Q	Terrain Analyst	179
107	13R	FA Firefinder Radar	171
108	75C	Personnel Management	170
109	13P	MLRS/LANCE Operation	168

Table B.2—continued

Rank	MOS	Title	No. of Grads in FY89
110	94F	Hospital Food Service	167
111	74F	Programmer/Analyst	165
112	52F	Turbine Engine Drive	164
113	29S	Field Commo Security	162
114	68G	Aircraft Structural	154
115	29Y	SATCOM Systems Repairer	153
116	13C	Tacfire Operations	139
117	68D	Aircraft Powertrain	137
118	63N	M60A1/A3 Tank System	136
119	68N	Avionic Mechanic	132
120	33T	EW/Intercept Tactical	131
121	68R	Avionic Radar Repair	129
122	39E	Special Electronics	128
123	68F	Aircraft Electrician	127
124	91R	Veterinary Food Insp	126
125	55R	Ammunition Stock Con	125
126	96D	Imagery Analyst	124
127	45B	Small Arms Repairer	120
128	35G	Biomedical Equipment	116
129	55G	Nuclear Weapons Spec	115
130	29N	Telephone Central Of	113
131	36L	Transportable Automat	112
132	91S	Preventive Medicine	111
133	33P	EW/Intercept Strateg	110
134	35H	TMDE Maintenance Sup	109
135	25R	Visual Info/Audio Equ	109
136	88K	Watercraft Operator	108
137	31D	MSE Transmission Sys	108
138	16E	Hawk Fire Control Crew	106
139	45D	Self-Propelled FA	106
140	63G	Fuel & Electrical Sys	102
141	95D	CID Special Agent	102
142	24M	Vulcan System Mechanic	100
143	76J	Medical Supply Spec	100
144	39D	Decentralized Svc Su	98
145	96F	Psychological Operat	97
146	88N	Traffic Management	96
147	39B	Automatic Test Equip	95
148	57E	Laundry & Bath Spec	95
149	91G	Behavioral Science	95
150	33Q	EW/Intercept Strateg	92
151	45L	Artillery Repairer	92
152	68L	Avionic Communication	91
153	29F	Fixed Communications	90
154	91Q	Pharmacy Specialist	89
155	91P	Xray Specialist	87
156	25Q	Graphics Documentat	86
157	73D	Accounting Specialist	82
158	27M	MLRS Repairer	82
159	39C	Target Acquisition/S	81
160	55D	Explosive Ordnance	80
161	33R	EW/Intercept Aviation	79
162	27F	Vulcan Repairer	79
163	97G	Counter-Signals Intel	78
164	21G	Pershing Electronics	77
165	21L	Pershing Electronics	77

Table B.2—continued

Rank	MOS	Title	No. of Grads in FY89
166	46N	Pershing Electrical	75
167	25P	Visual Info/Audio Do	75
168	46Q	Journalist	73
169	91J	Physical Therapy Spec	72
170	75D	Personnel Records Spec	72
171	93F	FA Meteorological Crew	69
172	16J	Defense Acquisition	68
173	83F	Printing & Bindery	67
174	91T	Animal Care Specialist	67
175	57F	Graves Registration	67
176	41C	Fire Control Instrum	66
177	27G	Chaparral/Redeye Rep	65
178	91F	Psychiatric Specialist	61
179	68B	Aircraft Powerplant	61
180	77W	Water Treatment Spec	61
181	46R	Broadcast Journalist	60
182	31F	MSE Network Switching	60
183	68Q	Avionic Flight System	58
184	27B	Land Combat Support	58
185	24K	Hawk Continuous Wave	55
186	91Y	Eye Specialist	52
187	25S	Still Documentation	51
188	51R	Interior Electrician	51
189	25L	AN/TSQ 73 Ada Com	49
190	27N	Forward Area Alerting	49
191	45G	Fire Control Systems	47
192	91H	Orthopedic Specialist	47
193	88L	Watercraft Engineer	46
194	71C	Executive Administrat	46
195	82B	Construction Surveyor	44
196	27J	Hawk Field Maint Equ	44
197	43M	Fabric Repair Spec	44
198	67S	Scout Helicopter Rep	44
199	67H	Observation Airplane	43
200	62H	Concrete & Asphalt	42
201	45N	M60A1/A3 Tank Turret	40
202	33V	EW/Intercept Aerial	39
203	24C	Hawk Firing Section	38
204	83E	Photo & Layout Spec	38
205	51K	Plumber	38
206	24N	Chaparral System Mech	38
207	24G	Hawk Information Coor	34
208	29V	Strategic Microwave	34
209	27H	Hawk Firing Section	33
210	00B	Diver	33
211	44E	Machinist	32
212	68H	Aircraft Pneudraulic	31
213	42D	Dental Laboratory Spec	31
214	96H	Aerial Intelligence	31
215	39L	FA Digital Systems	29
216	91U	Ear Nose & Throat Spec	28
217	93D	Air Traffic Control	24
218	71E	Court Reporter	23
219	52E	Prime Power Production	22
220	39G	Automated Communicat	22
221	77L	Petroleum Laboratory	22

Table B.2—continued

Rank	MOS	Title	No. of Grads in FY89
222	91N	Cardiac Specialist	21
223	42E	Optical Laboratory	20
224	51M	Fire Fighter	19
225	81B	Technical Drafting	19
226	82D	Topographic Surveyor	19
227	24H	Hawk Fire Control Re	19
228	91L	Occupational Therapy	19
229	39Y	FA Tactical Fire Dir	18
230	91V	Respiratory Specialist	18
231	27L	LANCE System Repairer	17
232	01H	Biological Sciences	15
233	51G	Materials Quality Spec	13
234	81C	Cartographer	13
235	62G	Quarrying Specialist	11
236	92E	Cytology Specialist	11
237	91X	Health Physics Spec	9
238	42C	Orthotic Specialist	7
239	23R	Hawk Missile System	0
240	27K	Hawk Fire Control Coor	0
241	27T	Pedestal Mounted Sti	0
242	91W	Nuclear Medicine Spec	0

Table B.3

Rankings of MOS by Total Cost in FY89

Rank	MOS	Title	No. of Grads in FY89	Per-Capita Cost	Estimated Total Cost
1	11B	Infantryman	11326	$8,767	$99,286,000
2	88M	Motor Transport Oper	3764	$26,043	$98,030,000
3	95B	Military Police	4161	$20,043	$83,404,000
4	91A	Medical Specialist	3962	$13,502	$53,501,000
5	13B	Cannon Crewman	3966	$10,657	$42,267,000
6	98G	EW/Signal Intelligence	1131	$31,367	$35,488,000
7	63B	Light Wheel Vehicle	2534	$13,207	$33,462,000
8	94B	Food Service Special	2370	$13,410	$31,781,000
9	31C	Single-Channel Radio	1581	$18,547	$29,321,000
10	12B	Combat Engineer	2979	$8,575	$25,542,000
11	13F	Fire Support Special	1329	$17,724	$23,562,000
12	54B	Chemical Operations	1124	$20,470	$23,013,000
13	63W	Wheel Vehicle Repair	1054	$20,736	$21,860,000
14	11M	Fighting Vehicle Inf	2344	$9,118	$21,373,000
15	31K	Combat Signaler	1408	$14,770	$20,798,000
16	19K	M1 Armor Crewman	2440	$8,504	$20,748,000
17	76Y	Unit Supply Specialist	1766	$11,141	$19,681,000
18	98C	EW/Signal Intelligence	750	$26,043	$19,521,000
19	76C	Equipment Records	1396	$13,231	$18,473,000
20	31M	Multichannel Commo	906	$20,312	$18,401,000
21	19D	Cavalry Scout	2012	$9,101	$18,314,000
22	77F	Petroleum Supply Spec	1217	$15,021	$18,275,000
23	52D	Power-Generation Equ	1156	$14,592	$16,866,000
24	29N	Telephone Central Of	113	$149,424	$16,828,000
25	67T	Tactical Transport	605	$26,043	$15,767,000
26	63H	Track Vehicle Repair	632	$22,121	$13,983,000
27	31V	Unit-Level Communicat	919	$15,091	$13,870,000
28	98H	Morse Interceptor	496	$27,173	$13,478,000
29	72E	Tactical Telecommun	792	$16,878	$13,375,000
30	71L	Administrative Spec	1115	$11,954	$13,331,000
31	63T	Bradley Fighting Veh	649	$20,345	$13,213,000
32	16S	MANPADS/STINGER Crew	956	$13,435	$12,850,000
33	29E	Radio Repairer	318	$40,395	$12,827,000
34	88H	Cargo Specialist	492	$26,043	$12,815,000
35	93C	Air Traffic Control	481	$26,043	$12,530,000
36	76V	Material Storage	1064	$11,548	$12,286,000
37	75B	Personnel Administrat	884	$13,828	$12,220,000
38	24T	PATRIOT Operator	215	$55,890	$12,031,000
39	11C	Indirect Fire Infantry	1403	$8,357	$11,728,000
40	63S	Heavy Wheel Vehicle	977	$11,668	$11,397,000
41	31L	Wire Systems Install	783	$14,484	$11,334,000
42	67N	Utility Helicopter	430	$26,043	$11,191,000
43	98K	Non-Morse Interceptor	408	$26,043	$10,626,000
44	16T	PATRIOT Missile Crew	577	$18,100	$10,440,000
45	72G	Automatic Data Telect	525	$19,650	$10,312,000
46	63E	M1 Abrams Tank Sys	515	$20,040	$10,312,000
47	67Y	AH-1 Attack Helicopter	382	$26,043	$9,950,000
48	02X	Bandsman	357	$26,043	$9,297,000
49	91C	Practical Nurse	351	$26,043	$9,144,000
50	67R	AH-64 Attack Helicopter	335	$26,043	$8,737,000
51	11H	Heavy Antiarmor Weap	1043	$8,332	$8,693,000
52	93B	Aeroscout Specialist	313	$26,043	$8,160,000
53	27E	TOW/Dragon Repairer	297	$27,458	$8,149,000

Table B.3—continued

Rank	MOS	Title	No. of Grads in FY89	Per-Capita Cost	Estimated Total Cost
54	98D	Emitter Locator Iden	214	$37,981	$8,128,000
55	67U	Medium Helicopter Re	304	$26,043	$7,915,000
56	13M	Multiple Launch Rock	548	$14,234	$7,794,000
57	13E	Cannon Fire Directio	642	$11,848	$7,608,000
58	31Q	Tactical Satellite/M	446	$16,653	$7,423,000
59	76P	Material Control	651	$11,291	$7,350,000
60	16R	Vulcan Crewmember	534	$13,390	$7,156,000
61	92B	Medical Laboratory	349	$20,245	$7,063,000
62	68J	Aircraft Armament/Mi	271	$26,043	$7,062,000
63	63Y	Track Vehicle Mechan	354	$19,284	$6,824,000
64	71M	Chaplain Assistant	232	$29,121	$6,764,000
65	55B	Ammunition Specialist	541	$12,497	$6,757,000
66	33T	EW/Intercept Tactical	131	$48,731	$6,402,000
67	82C	FA Surveyor	411	$15,408	$6,326,000
68	96B	Intelligence Analyst	453	$13,615	$6,168,000
69	29M	Tactical Satellite/M	179	$34,281	$6,153,000
70	52C	Utilities Equipment	355	$17,164	$6,090,000
71	67V	Observation/Scout He	231	$26,043	$6,025,000
72	93P	Aviations Operations	228	$26,043	$5,950,000
73	33P	EW/Intercept Strateg	110	$53,636	$5,911,000
74	98J	EW/Signal Intelligence	240	$23,828	$5,723,000
75	63J	Quartermaster & Chem	328	$17,330	$5,689,000
76	97E	Interrogator	376	$15,118	$5,683,000
77	15E	Pershing Missile Crew	343	$16,539	$5,676,000
78	44B	Metal Worker	236	$22,990	$5,423,000
79	45K	Tank Turret Repairer	194	$26,855	$5,217,000
80	71D	Legal Specialist	317	$16,289	$5,160,000
81	19E	M60 Armor Crewman	557	$9,101	$5,070,000
82	97B	Counterintelligence	310	$15,942	$4,945,000
83	43E	Parachute Rigger	294	$16,791	$4,935,000
84	45T	Bradley Fighting Veh	211	$23,417	$4,935,000
85	39E	Special Electronics	128	$38,160	$4,879,000
86	33Q	EW/Intercept Strateg	92	$52,737	$4,860,000
87	31N	Commo Systems/Circui	266	$18,173	$4,834,000
88	16P	Chaparral Crewmember	335	$14,421	$4,824,000
89	81Q	Terrain Analyst	179	$26,043	$4,653,000
90	13N	LANCE Crewmember	306	$15,101	$4,618,000
91	29J	Teletypewriter Equip	189	$23,443	$4,426,000
92	74F	Programmer/Analyst	165	$26,043	$4,300,000
93	36L	Transportable Automa	112	$38,081	$4,277,000
94	62E	Heavy Construction	496	$8,596	$4,266,000
95	21L	Pershing Electronics	77	$54,629	$4,195,000
96	12F	Engineer Tracked Veh	214	$19,546	$4,191,000
97	68G	Aircraft Structural	154	$26,043	$4,019,000
98	27F	Vulcan Repairer	79	$49,744	$3,907,000
99	45E	M1 Abrams Tank Turret	188	$20,308	$3,808,000
100	51B	Carpentry & Masonry	244	$15,410	$3,760,000
101	16D	Hawk Missile Crewmem	261	$14,229	$3,711,000
102	68D	Aircraft Powertrain	137	$26,043	$3,565,000
103	68N	Avionic Mechanic	132	$26,043	$3,433,000
104	63D	Self-Propelled FA Sys	276	$12,177	$3,357,000
105	68R	Avionic Radar Repair	129	$26,043	$3,355,000
106	29Y	SATCOM Systems Repair	153	$21,792	$3,324,000
107	62J	General Construction	393	$8,414	$3,306,000
108	68F	Aircraft Electrician	127	$26,043	$3,301,000
109	73C	Finance Specialist	229	$14,322	$3,275,000

Table B.3—continued

Rank	MOS	Title	No. of Grads in FY89	Per-Capita Cost	Estimated Total Cost
110	96R	Ground Surveillance	264	$12,382	$3,269,000
111	24M	Vulcan System Mechan	100	$31,960	$3,210,000
112	29S	Field Commo Security	162	$19,750	$3,207,000
113	33R	EW/Intercept Aviation	79	$40,249	$3,168,000
114	24G	Hawk Information Coor	34	$91,150	$3,119,000
115	39D	Decentralized Svc Su	98	$31,707	$3,118,000
116	12C	Bridge Crewman	361	$8,616	$3,109,000
117	35G	Biomedical Equipment	116	$26,043	$3,024,000
118	62B	Construction Equipme	357	$8,320	$2,972,000
119	74D	Computer/Machine Ope	182	$15,851	$2,882,000
120	36M	Switching Systems Op	202	$14,259	$2,877,000
121	39B	Automatic Test Equip	95	$30,177	$2,866,000
122	35H	TMDE Maintenance Sup	109	$26,043	$2,851,000
123	75F	Personnel Information	181	$15,662	$2,829,000
124	88K	Watercraft Operator	108	$26,043	$2,820,000
125	31D	MSE Transmission Sys	108	$26,043	$2,800,000
126	27B	Land Combat Support	58	$48,466	$2,794,000
127	13R	FA Firefinder Radar	171	$16,254	$2,785,000
128	75C	Personnel Management	170	$16,226	$2,753,000
129	76X	Subsistence Supply	245	$11,200	$2,740,000
130	95D	CID Special Agent	102	$26,043	$2,644,000
131	27G	Chaparral/Redeye Rep	65	$40,421	$2,641,000
132	52F	Turbine Engine Drive	164	$15,983	$2,619,000
133	55G	Nuclear Weapons Spec	115	$22,492	$2,584,000
134	63N	M60A1/A3 Tank System	136	$18,709	$2,547,000
135	13P	MLRS/LANCE Operation	168	$15,101	$2,532,000
136	63G	Fuel & Electrical Sys	102	$24,736	$2,530,000
137	88N	Traffic Management	96	$26,043	$2,495,000
138	25R	Visual Info/Audio Equ	109	$22,735	$2,478,000
139	96D	Imagery Analyst	124	$19,413	$2,408,000
140	68L	Avionic Communication	91	$26,043	$2,382,000
141	24K	Hawk Continuous Wave	55	$42,893	$2,373,000
142	91E	Dental Specialist	227	$10,229	$2,326,000
143	29F	Fixed Communications	90	$25,490	$2,302,000
144	91D	Operating Room Spec	213	$10,742	$2,293,000
145	71G	Patient Administrat	184	$11,865	$2,187,000
146	75E	Personnel Actions Spec	198	$10,719	$2,124,000
147	39C	Target Acquisition/S	81	$26,043	$2,115,000
148	97G	Counter-Signals Inte	78	$26,043	$2,034,000
149	91S	Preventive Medicine	111	$18,241	$2,028,000
150	25L	AN/TSQ 73 Ada Com	49	$40,457	$1,986,000
151	25Q	Graphics Documentation	86	$22,735	$1,955,000
152	46Q	Journalist	73	$26,043	$1,899,000
153	96F	Psychological Operat	97	$19,455	$1,884,000
154	45B	Small Arms Repairer	120	$15,308	$1,832,000
155	27N	Forward Area Alerting	49	$37,119	$1,817,000
156	93F	FA Meteorological Crew	69	$26,043	$1,795,000
157	91G	Behavioral Science	95	$18,957	$1,793,000
158	94F	Hospital Food Servic	167	$10,644	$1,777,000
159	21G	Pershing Electronics	77	$22,807	$1,756,000
160	83F	Printing & Bindery Spec	67	$26,043	$1,752,000
161	46N	Pershing Electrical	75	$23,283	$1,748,000
162	45L	Artillery Repairer	92	$18,895	$1,740,000
163	91T	Animal Care Specialist	67	$26,043	$1,740,000
164	91Q	Pharmacy Specialist	89	$19,233	$1,707,000
165	25P	Visual Info/Audio Do	75	$22,735	$1,705,000

Table B.3—continued

Rank	MOS	Title	No. of Grads in FY89	Per-Capita Cost	Estimated Total Cost
166	91R	Veterinary Food Insp	126	$13,311	$1,673,000
167	27M	MLRS Repairer	82	$20,187	$1,650,000
168	24C	Hawk Firing Section	38	$41,706	$1,602,000
169	68B	Aircraft Powerplant	61	$26,043	$1,591,000
170	16E	Hawk Fire Control Crew	106	$14,857	$1,575,000
171	46R	Broadcast Journalist	60	$26,043	$1,571,000
172	62F	Crane Operator	181	$8,619	$1,557,000
173	31F	MSE Network Switching	60	$26,043	$1,550,000
174	45G	Fire Control Systems	47	$32,660	$1,549,000
175	13C	Tacfire Operations	139	$11,120	$1,548,000
176	68Q	Avionic Flight Sys	58	$26,043	$1,510,000
177	91P	Xray Specialist	87	$17,029	$1,474,000
178	55D	Explosive Ordnance	80	$18,292	$1,471,000
179	45D	Self-Propelled FA Tu	106	$13,882	$1,469,000
180	41C	Fire Control Instru	66	$21,048	$1,383,000
181	55R	Ammunition Stock Con	125	$10,989	$1,374,000
182	24H	Hawk Fire Control Re	19	$71,306	$1,355,000
183	29V	Strategic Microwave	34	$39,206	$1,323,000
184	73D	Accounting Specialist	82	$15,973	$1,312,000
185	91J	Physical Therapy Spec	72	$17,631	$1,273,000
186	88L	Watercraft Engineer	46	$26,043	$1,203,000
187	33V	EW/Intercept Aerial	39	$30,176	$1,173,000
188	25S	Still Documentation	51	$22,735	$1,159,000
189	82B	Construction Surveyor	44	$26,043	$1,150,000
190	67S	Scout Helicopter Rep	44	$26,043	$1,139,000
191	57E	Laundry & Bath Spec	95	$11,962	$1,135,000
192	67H	Observation Airplane	43	$26,043	$1,128,000
193	27J	Hawk Field Maint Equ	44	$22,735	$1,000,000
194	83E	Photo & Layout Spec	38	$26,043	$990,000
195	57F	Graves Registration	67	$14,756	$982,000
196	16J	Defense Acquisition	68	$14,037	$960,000
197	76J	Medical Supply Spec	100	$9,467	$944,000
198	77W	Water Treatment Spec	61	$15,286	$931,000
199	71C	Executive Administrat	46	$19,614	$894,000
200	93D	Air Traffic Control	24	$37,151	$894,000
201	42D	Dental Laboratory Spec	31	$28,025	$873,000
202	00B	Diver	33	$26,043	$848,000
203	45N	M60A1/A3 Tank Turret	40	$20,877	$833,000
204	27H	Hawk Firing Section	33	$25,043	$826,000
205	68H	Aircraft Pneudraulic	31	$26,043	$813,000
206	39L	FA Digital Systems	29	$26,043	$748,000
207	75D	Personnel Records Sp	72	$10,238	$737,000
208	91F	Psychiatric Specialist	61	$11,192	$687,000
209	44E	Machinist	32	$20,047	$648,000
210	71E	Court Reporter	23	$26,043	$600,000
211	43M	Fabric Repair Spec	44	$13,393	$586,000
212	52E	Prime Power Production	22	$26,043	$584,000
213	24N	Chaparral System Mech	38	$15,147	$569,000
214	91Y	Eye Specialist	52	$10,324	$538,000
215	77L	Petroleum Laboratory	22	$24,388	$536,000
216	96H	Aerial Intelligence	31	$16,998	$526,000
217	42E	Optical Laboratory	20	$26,043	$514,000
218	51M	Fire Fighter	19	$26,043	$506,000
219	91H	Orthopedic Specialist	47	$10,756	$506,000
220	81B	Technical Drafting	19	$26,043	$504,000
221	82D	Topographic Surveyor	19	$26,043	$501,000

Table B.3—continued

Rank	MOS	Title	No. of Grads in FY89	Per-Capita Cost	Estimated Total Cost
222	39G	Automated Communicat	22	$22,735	$500,000
223	39Y	FA Tactical Fire Dir	18	$26,043	$467,000
224	51R	Interior Electrician	51	$8,468	$428,000
225	01H	Biological Sciences	15	$26,043	$400,000
226	62H	Concrete & Asphalt	42	$8,436	$354,000
227	81C	Cartographer	13	$26,043	$346,000
228	91L	Occupational Therapy	19	$18,293	$343,000
229	51K	Plumber	38	$8,535	$324,000
230	91V	Respiratory Special	18	$17,515	$314,000
231	27L	LANCE System Repaire	17	$17,391	$302,000
232	92E	Cytology Specialist	11	$26,043	$286,000
233	91U	Ear Nose & Throat Spec	28	$10,241	$284,000
234	51G	Materials Quality Spec	13	$19,386	$261,000
235	91X	Health Physics Spec	9	$26,043	$235,000
236	91N	Cardiac Specialist	21	$8,726	$182,000
237	42C	Orthotic Specialist	7	$27,132	$180,000
238	62G	Quarrying Specialist	11	$8,944	$99,000
239	23R	Hawk Missile System	0	$22,735	$0
240	27K	Hawk Fire Control Co	0	$26,043	$0
241	27T	Pedestal Mounted Sti	0	$22,735	$0
242	91W	Nuclear Medicine Spec	0	$26,043	$0

NOTE: Total cost estimate may not equal product of per-capita cost and number of graduates due to rounding.

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